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INACTIVE MIDDLE-AGED PEOPLE AND HOUSEHOLDS: INCENTIVES AND CONSTRAINTS

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Executive summary

In Hungary, less than two-thirds of the population between the age of 40 and the retirement age are in full-time employment. The overwhelming majority of the remaining one third are pensioners without any labour income. The employment of middle-aged people would improve the potential of the economy in two respects: employees produce value and pay taxes, and they do not represent a drain on the pension fund. Thus, in the longer term, this may also help to reduce the contributions payable from labour income.

It is primarily the exceedingly liberal regulations that promote early retirement. Until 2002, the retirement age increase of 1997 had scarcely any effect, because, having accumulated sufficient years of service, the vast majority of pensioners were able to retire at the previous retirement age. The disability pension offers yet another route finally to exit the labour market.

This paper looks at pensioners who are below the cut-off age of eligibility for old-age pension that came into effect in 1997, but who are over 40 years of age, based on the 1993–2001 Household Budget Survey (HBS) of the Central Statistical Office (CSO).

The majority of people taking early retirement are in work immediately prior to their retirement; significantly fewer people are unemployed. Looking at households over time we find that, after retirement, the personal income of the people affected drops by no more than 25 per cent, and the per capita household income by no more than 13 per cent on average. In the case of unemployed people, retirement often brings about no change in their income. This is because, even though pensions fall a good way short of the previous gross earnings, the net income declines significantly less than the gross income due to the absence of taxation.

Having examined the magnitude of incomes directly and indirectly, through the structure of expenditure, we find no significant decline or increase. This appears to indicate that grey or black employment is infrequent among pensioners below the official retirement age.

One of the key factors in determining early retirement, apart from personal circumstances, is size of salary and the amount of the pension expected on the basis of that salary. This indicates that retirement is substantially influenced not only by the decreased demand for the elderly on the labour market, but also by individual motivations.

1. Introduction

In the aging developed world, the economic activity of the middle-aged is an outstandingly important issue for government policies. Middle-aged people in employment create value and pay taxes; they also do not tap into the pension fund too early and, ideally, they make less use of the health services. All these factors motivated the EU recommendations made in Lisbon in 2000 that, *inter alia*, a significantly higher proportion of the elderly should be employed than is now the case. Compared to other countries, Hungary's position is none too favourable: a large number of the middle-aged do not work, even if they are below the legal retirement age – they find various ways out of the labour market. Naturally, there are good reasons for this: a high proportion of the elderly have obsolete or obsolescent knowledge, or are less adaptable, and businesses competing on the international market have little interest in employing them.

It is a well-known fact that in Hungary today, despite the relatively low unemployment rate, employment is also relatively low by European standards: only 59 per cent of the 15 to 64-year-old population is employed, whereas the EU average is some 10 percentage points higher; the rate is especially low among the cohort aged between 40 and 60.[1] This suggests that, in addition to uneducated young people and the young women who are not working for other reasons, we can, or should, expect the activation of the population aged between 40 years and the retirement age to contribute significantly to the convergence of our employment rates to the EU average.

Before we can take appropriate measures to increase the activity of the middle-aged population, we must be aware of the reasons why they become inactive. As a major change is called for, it would be good if people who would otherwise retire as early as possible were motivated by market forces, rather than merely administrative measures compelling them to work until a later stage in their lives.[2] These measures must be efficient enough to increase participation, yet selective enough not to capture those who really are unable to work, rather than the work-shy. Moreover, by obtaining more accurate information on such behaviour, we can more accurately calculate the impact of the required measures on government expenditure.

A simple calculation will indicate the volumes at issue.[3] In 2001, there were some 830 thousand pensioners below the legal retirement age – a figure boosted that

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[1] This ratio is not improved significantly, even if we take into consideration that a far from negligible part of the age cohort generally used for the sake of international comparison (primarily women) are over the legal retirement age.

[2] It should be noted, however, that the continuous raising of the retirement age has not been accompanied by any major uproar, while the raw data of the CSO labour force survey indicate that it increased employment in the years concerned. Nevertheless, the compulsory and extensive raising of the retirement age obviously has its limitations, governed primarily by deterioration of health.

[3] The calculation was based on Tables 3.1 and 3.2 in the *Munkaerőpiaci tükör* (2004), Figure 5 in Scharle (2003) and the CSO Household Budget Survey (see explanation in Section 2). The amounts are in year 2003 Forints. The correctness of the calculation assumes that the people removed from pensioner

year by 60 thousand disabled people and over 30 thousand old-age pensioners, or a total of 90 thousand people. Prior to their retirement, they had earned HUF 860 thousand a year on average; after retirement, they received a pension of roughly HUF 420 thousand, and the overwhelming majority of them no longer worked. This represents an aggregate of HUF 77 billion in lost income (gross earnings) (plus the associated social insurance contributions), and entails some HUF 38 billion of pension outlay. Even though these figures were obtained by considering the entire age cohort below retirement age, it may not be unrealistic to expect adequate regulations and employment policy to halve the influx of disability pensioners, and to increase by several years the effective age for old-age retirement. The annual gain from these two factors (in the case of the latter, with only a one-year rise in the active age) would be approximately HUF 38 billion each – over HUF 75 billion in total per annum. This is the sum of gross earnings forgone and pensions unpaid; naturally, the additional contributions and tax revenues arising from employment, and the extra consumption arising from higher incomes, should be added, and the cost of benefits to people who would potentially become unemployed should be deducted. If none of the people who would otherwise retire were to join the unemployed, the employment rate would increase by about one percentage point.

2. Activity of middle-aged people

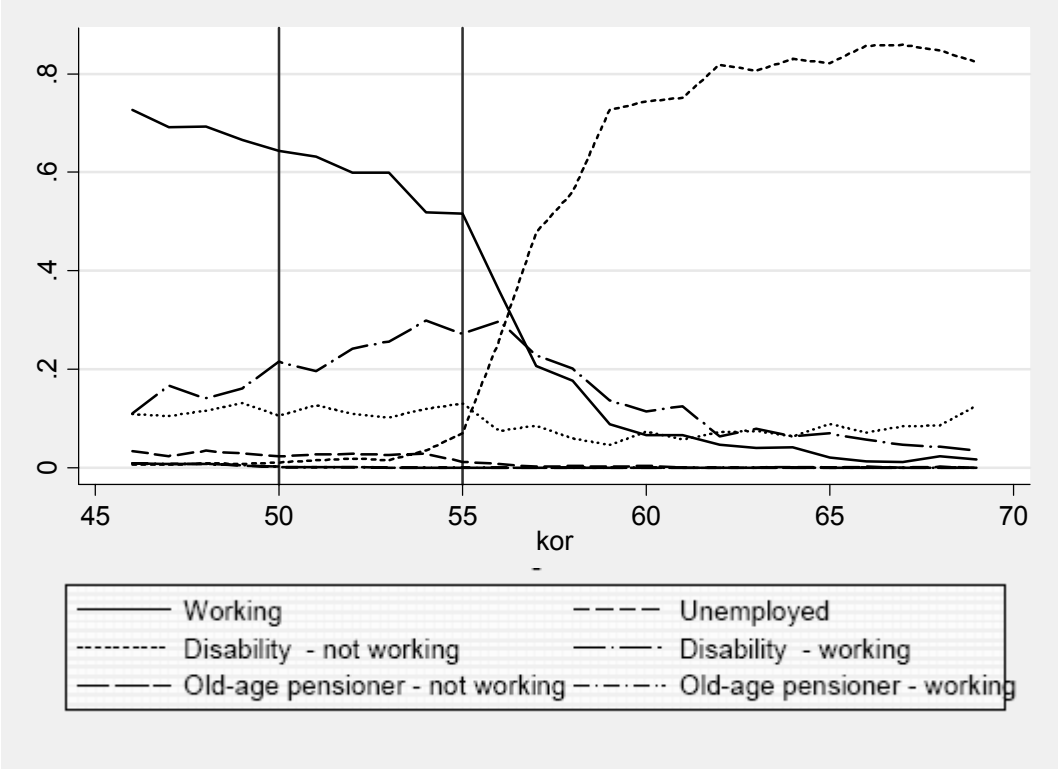
2.1 Career activity

The time series of activity trends for the entire population and for various qualification and age groups are known relatively accurately (see, for example, *Munkaerőpiaci tükör,* 2004; Lelkes and Scharle, 2004). These indicate that activity and age are in a typical correlation, described in detail in Figure 1. This depicts, separately for men and for women, the ratios of employed, unemployed, disability and old-age pensioners, people on parental leave and with other status, for various age groups in 2001.

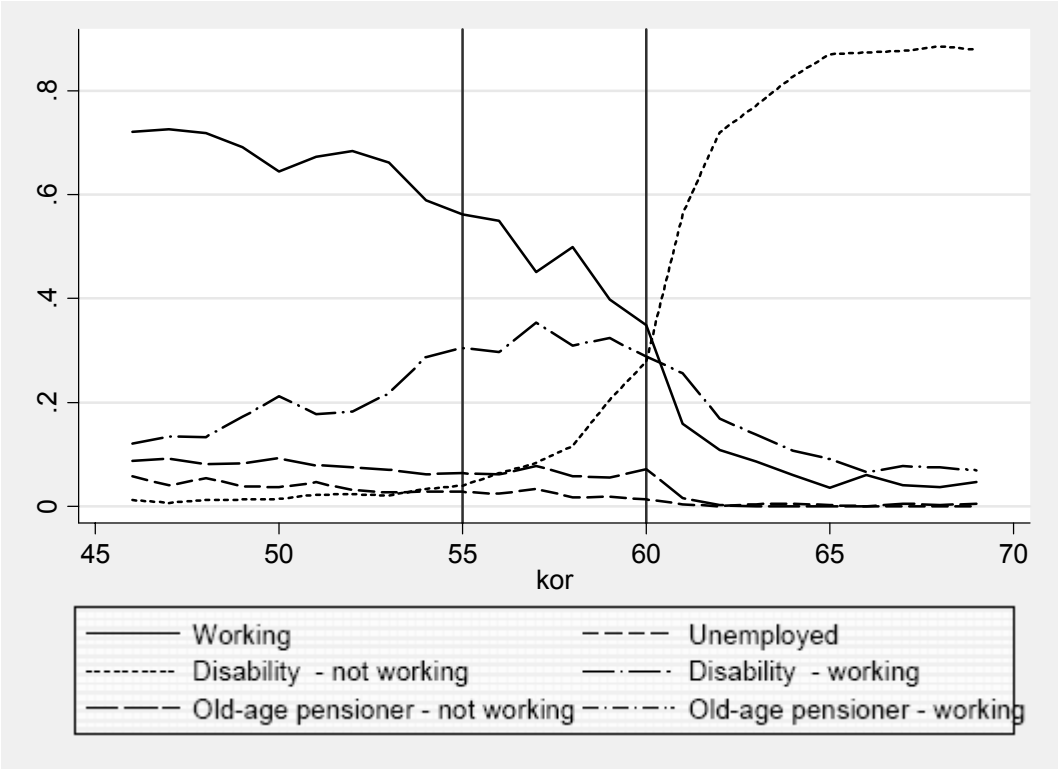
status in the recommended manner retain their previous job opportunities or are able to find comparable jobs, rather than being moved into some other welfare scheme.

Fig. 1. Economic activity status in the various age cohorts, in 2001

Women



Men



Source: CSO Labour Force Survey, 2001/Q1.

Apart from the fact that young women tend to stay at home with their children more often, and have 'other' status more often than men do in all age cohorts, the ratio of the employed and pensioners appears very similar for the two sexes until approximately the age of 45. Over that age, employment declines steadily, the entire loss being accounted for by the increased proportion of disability pensioners. One important difference is that more women of 40 years and above are active than men in the same age groups. The situation changes radically as we approach the old-age retirement age. The number of old-age pensioners increases steeply at the age eligible for early retirement (60 for men, 55 for women), and reaches close to 100 per cent eight to 10 age years later.[4] In this respect, there is no significant difference between men and women. Thus it appears that practically no one works after the retirement age, while in the preceding period the intensive decline in participation is attributable either to the extremely steeply deteriorating health of the population, or to the fact that an ever increasing number of people started to use disability pensioner status for 'even earlier' retirement. Even though widespread resentment may be caused by the assumption that it is the unfavourable labour market opportunities rather than health that is the motivation for taking disability pensioner status, Lelkes and Scharle (2004) does support that notion. The relatively high proportion of the 'other' status is also worth noting. This is easier to explain in the case of women, because we know that being a 'full-time' homemaker is more common among them. In the case of men, and also of women not active in the household, this category encompasses a highly heterogeneous group of people, ranging from the unemployed who are not inactive but are not looking for work, through erroneous responses, to people taking employment very infrequently and irregularly.

2.2. Participation in international comparison

It remains a question, however, whether the phenomena described above should be regarded as Hungarian peculiarities, or whether they result from the population and the more or less similar global economic environment. To facilitate comparison, Figure 2 shows the participation rates of two European countries in a graph similar to the one used above.

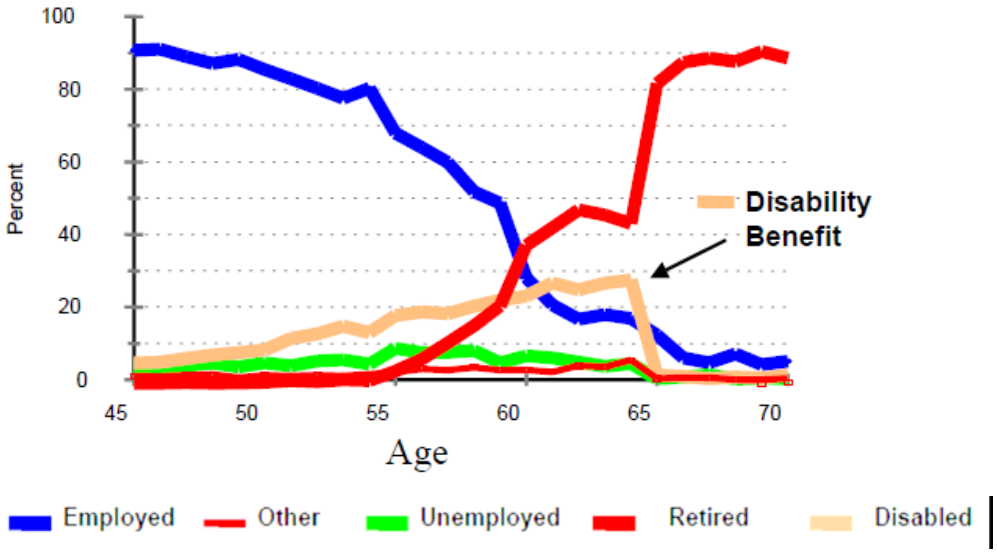
The United Kingdom has a considerably more advanced economy than Hungary, but in the 1980s its industrial structure underwent a similar transformation to that seen in Hungary; this resulted in a very high number of poorly qualified

[4] Despite the continuous raising of the retirement age since 1997 (in 2001, 62 for men, 58 for women), with sufficient length of service it is possible to retire with full pension at the previous earliest retirement age, i.e. at 60 and 55, respectively. The data disclosed in the study of the National Pension Insurance Directorate General appear to indicate that the overwhelming majority of the population had the required years of service, as some 95 per cent of all old-age pension awards were made before the legal retirement age (ONYF, 2004). The different increase in the proportion of pensioners indicated in Figure 1 is partly attributable to the difference in the years of service.

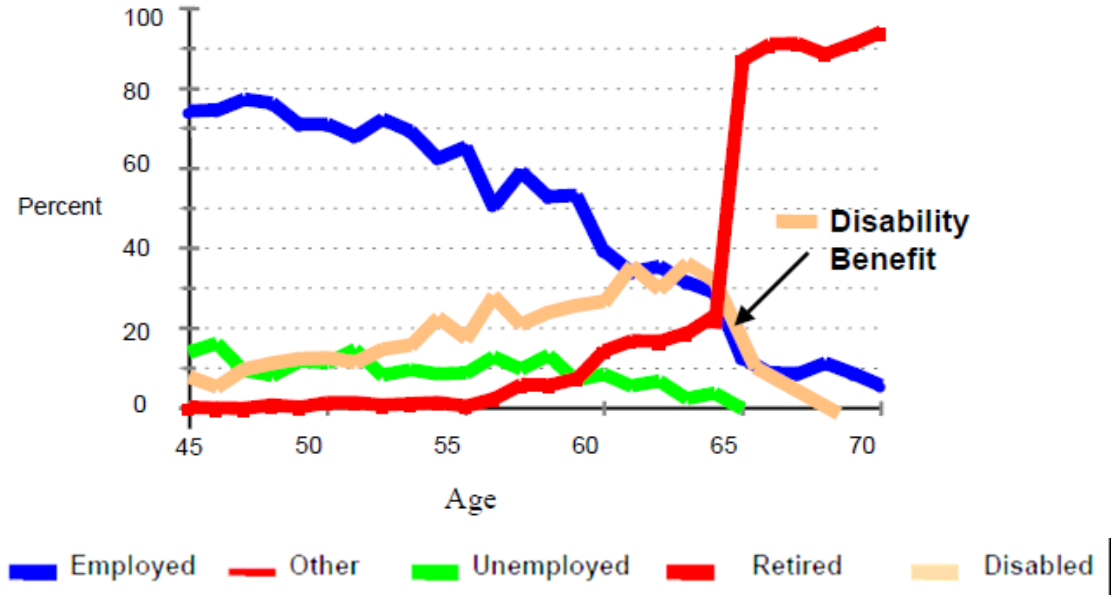
people left without jobs (see, for example, the report in Faggio and Nickell, 2003). The Netherlands did not suffer similar shocks, but it has a high level of social benefits.

Fig. 2. Status of economic activity in the various age cohorts in the United Kingdom and the Netherlands, in 2001 (men only)

United Kingdom



The Netherlands



Source: Presentation by Richard Blundell: 'Pension incentives and the pattern of retirement', 2002.

The retirement age is noticeably higher in both countries than in Hungary: the ratio of old-age pensioners rises steeply at the age of 65. This rise is faster than in

Hungary, but the ratio eventually flattens out at a similar rate of 90 per cent. Also importantly, in both countries there is a five-year period before the specified retirement age, when retirement is possible if certain conditions are fulfilled. As regards disability pensioner status – the most important channel for early retirement – all three countries are in a similar position: the ratio of disabled people starts rising steeply at the age of 40–50, and is followed by a decline from the c. 35 per cent level once old-age pension eligibility is reached. The absolute figures underlying the similar trends are very different: in the UK and the Netherlands, 10 per cent of 50-year-old men are disability pensioners, while in Hungary the corresponding ratio is 20 per cent. However, the difference is far less marked if we calculate the time *backwards* from the retirement age; that is, if we compare 50-year-old men in Hungary with 55-year-old men in the UK or the Netherlands. Thus the situation is fundamentally similar in all three countries – the differences in employment are attributable primarily to the retirement age, the other regulations affecting the effective retirement age (UK), and the low unemployment rate (Netherlands).

Apparently, if the *effective* retirement age in Hungary were to reach the EU-15 level, some of the employment problems would disappear. This would mean raising the formal retirement age to 65 years or more, and the removal of benefits that allow the current very early retirement. Naturally, such measures can only succeed if people, adapting to the changing conditions, are able to find jobs; or, put another way, only if employers are able to provide jobs for the population that is currently withdrawing en masse from the labour market. Since we have little understanding of such issues, due largely to the extreme difficulties involved in studying them, let us turn our attention to the issue of activity before retirement.

We have focused mostly on the large-scale inactivity of the early elderly years; in order to filter out the potentially different effect mechanisms (see later), we have only looked at the population over 40. Considering that, on the one hand, the retirement age increase took effect only in 1998, and on the other hand, the effective retirement age remained very low even afterwards (and its volatility is affected by the years of service, on which we have no specific information), it is worth delimiting the age from the top end as well. To be on the safe side, we have selected as the limit the 2nd year before the retirement age effective in 1997, i.e. 58 for men and 53 for women. As another, seemingly ad hoc limitation of the population, we have left single-person households out of the analysis, which results in the loss of almost 15 per cent of the sample. We took that decision because we are going to examine the change in the entire environment affecting individuals, i.e. the household, and in that respect single people are difficult to compare with those living with a partner. Even though single people are more frequently inactive or unemployed than the average, so far as other individual characteristics relevant for our purposes are concerned, they appear to be little different from their peers living within a family. Finally, it would have been useful to treat men and women separately, because their actions may be governed by different motivations, but this was not possible because of the low number of observations. Thus, below we consider the age group 40–58 for men and 40–53 for women who live in families.

2.3 Forms of activity and their transition

Before attempting to explain the movements between the various forms of activity, we must undertake an overview of the frequency of the various statuses and the flows between them. The primary source of data relating to economic activity is the Labour Force Survey of the CSO, but as the analyses to be described later rely on the CSO Household Budget Survey (HBS), we will also use that data source for this purpose. Its advantages and disadvantages are described in detail in Section 2, and the terms used below are also defined there.

Table 2. Flows between categories of activity (in t=3) according to categories of the previous period (t=1), for middle-aged people living with a partner, in two age groups between 25 and the retirement age (per cent)

	Activity in t=3					
Activity in t=1	Employed	Unemployed	Pensioner	Other inactive	Total	Together
Between 40 yrs. and retirement age						
Employed	86	5	8	1	100	64
Unemployed	40	28	26	6	100	10
Pensioner	5	0	94	1	100	20
Other inactive	24	7	22	47	100	6
Together	61	7	28	4	100	100
Between 25 yrs. and 40 yrs.						
Employed	89	6	1	4	100	64
Unemployed	46	35	4	15	100	14
Pensioner	15	2	82	1	100	4
Other inactive	31	10	3	56	100	18
Together	70	11	5	15	100	100

Source: own calculations based on the relevant periods of the HBS pooled panel (see data description in Section 2).

Table 2 reveals the proportion of members of the observed group moving from one activity category[5] into another between two periods one year apart (t=1 and t=3). As well the flows for the group above 40 but below retirement age, we also present the flows for the population below 40, by way of comparison.

The pattern for the over-45 age group is characteristically different from the pattern for the younger group (as also indicated in Figure 1), not only in the distribution of activity, but also in the probability of transfer between activity

[5] It is important to note about the categories used that the 'pensioner' transfer-status is included among the activity statuses. These pensioners are more correctly inactive people who receive a pension, and have only negligible other income. On the other hand, we find pension recipients among the employed: in their case, labour income is the decisive element.

categories. Unemployment is higher in the younger group, even though the likelihood of job loss is similar. The reason for this lies in the ways people move out of unemployment. While, for young people, the way out (apart from returning to the labour market or continued unemployment) is mostly inactivity, for the older group retirement is an available 'solution'.[6] Roughly one third of the elderly unemployed become pensioners, as opposed to approximately four per cent for the young; in the case of people in employment, the corresponding figures are eight per cent and one per cent, respectively. This directly shows the significance of retirement in 'addressing' labour market difficulties by opening a way out of that market.

2.4 The subject of the study

Our information concerning the reasons underlying early retirement comes primarily from studies that rely on the data of the Central Statistical Office Labour Force Survey (LFS), which concentrates on individual behaviour (see, for example, Lelkes and Scharle, 2004). This survey, using a very large sample, collects information about each member of the household, but focuses on the labour market status of people, and thus the range of available data represents a significant constraint on the phenomena that can be examined. As we shall see, in addition to the labour market characteristics in the narrow sense, detailed knowledge of the individual's environment also offers important clues as to how to reduce inactivity. This may facilitate the identification of causes (e.g. illness prior to the change) underlying exit from the labour market, as well as the detection of phenomena that indirectly signal the financial and labour market strategy pursued by the person who has become inactive and by his family (such as the size or structure of expenditure). This paper hopes to supplement our current knowledge in this respect. To this end, it estimates a more comprehensive model than the one used earlier, relying on a panel version of the CSO Household Budget Survey (HBS), which has such information in abundance.

In the study, we set out to answer three questions:

1. Whether the financial management of the inactive person or his family exhibits any attempts to respond to the altered income level, and thus to alleviate difficulties. If retirement brings about considerable financial loss from the prior situation, and the labour market offers possibilities for its alleviation, we ought to witness an increase in alternative income or a reduction in expenditure.
2. As indicated above (and by other studies), the chances of elderly people finding formal employment are not good. It remains to be seen, however, whether those in early retirement are effectively inactive. Is it not possible that formal inactivity

[6] The 'other inactive' category includes women rearing their children in the home, thus the rate of transfer from unemployment is very different for the two sexes. Unemployed men very often remain unemployed. Naturally it is not evident that women going from unemployment status into rearing children are trying to escape from the labour market. Even though we have practically no information about this issue, it is suggested by everyday experience.

is accompanied by informal work? We can attempt to answer that question by examining the correspondence between expenditure and income data.

3. The third question relates to the relationship between individual characteristics and early retirement. In that context, it is important what effects the personal characteristics of the individual, the behaviour of his partner, and the circumstances of the household have on his retirement decision. However, the financial incentives that dominate the financial side of the decision play an outstanding role, because these can be most directly influenced by government measures. Using figures on actual salaries and pensions, we shall attempt to quantify the effect of such measures on the probability of retirement.

2.5 Important factors not discussed

The aforementioned objectives serve to answer one question: what instruments could be used to increase the employment of the elderly? However, the proposed approach does have some important constraints that must be taken into consideration:

- The analysis relies on the HBS data files from between 1993 and 2001. Accordingly, it can reflect the impacts of the retirement age rise, implemented slowly but steadily after 1997, only to a limited extent, if at all. All we know about the outcome of the retirement age rise is that, on the one hand, it substantially increased employment among the age group directly affected (raw data of the CSO Labour Force Survey), and on the other hand, as retirement at the previous retirement age continued to be possible if sufficient years of service had been accumulated, a new selection mechanism was triggered. However, as we are going to look at early retirement, those factors will hopefully have no significant effect on our results.

- Even though child-bearing has little part to play in the age group examined, its indirect effect on employment is far from negligible. Firstly, as our data indicate, the partner of an average 50-year-old man is 46 years old, and even though this varies between 34 and 60, most are aged between 42 and 50. Even though women are having their first and last children at an increasingly late age, in the relevant age cohort only a small proportion of the women are out of work because they are at home with their own infants or small children. We would need a completely different approach and data to evaluate the activities of the women rearing their children or helping out with their grandchildren: whether they should be regarded as a reserve labour force or as domestic producers of a child care service that could be obtained on the market.[7] Even though we are aware of the presence of children in the household, and use such information, we know nothing about help provided to relatives living elsewhere, which may distort our results. For this reason, we are

[7] The in-depth analyses of the Central Statistical Office's 'Time balance' Surveys may contribute to that substantially. One of the first studies is that of the Nonprofit Munkacsoport on the labour reserves of the population, the summary of which has been published recently. The entire study is not yet available.

unable to discuss the switch between the work of women in the household and in the market.

- Though general household surveys provide indirect information concerning health, there is an issue here of effects that can be observed with very low accuracy, if at all. In surveys documenting in detail economic activity and financial conditions, the details of health status are not known, with the possible exception of one or two main factors. However, specialised surveys indicate that, in general, disability retirement goes hand in hand with a significant deterioration in health. In his paper Kovács (2004) examines, using various approaches, the scores generated by the question asked in the panel survey of the CSO Demographic Research Institute's 'Életünk fordulópontjai' ['Turning points in our life course'] about the health of the respondents. In his Table 2/21, he discloses the differences between the health assessments of the people on disability pension and other pensions, by age cohort. In the case of the 45–55 age group, these values are 3.86 and 5.48; in the 55–65 age cohort 4.23 and 6.32, respectively. The author concludes:

> *"There is a huge difference in the health assessment of those starting their pensionable life as disability pensioners and those retiring as something else, to the detriment of the latter. Thus, in that respect, the whole system of disability pensions can be regarded as equitable."*

Therefore, we cannot rule out the possibility that, even though some of the disability pensioners do abuse their position, the continuous and large-scale inflow into that group is attributable to the large proportion of employees suffering severe health impairments. There are convincing arguments that the report on the individual's own health status is a very good approximation of the actual working capacity. However, the same study contains an important result on the assistance given and received by those with incapacitating health impairments. Accordingly:

> *"…assistance provided in the form of cash or labour is significantly lower only in the case of the 45 and over group. However, apparently the provision of in-kind assistance is not hindered by incapacitating health impairments. The proportion of those who provide assistance among sufferers from such illnesses is close to the average and, indeed, in certain age groups is even higher."*

This latter statement appears to indicate that there are useful activities that even sufferers from such severe ailments would be able to perform, but the available capacity is not used in the market because of the size and structure of the labour demand or the additional benefit offered by the family activity.

2.6 The data used

This study relies on the CSO Household Budget Survey (HBS). Since 1993 the survey has annually recorded the data of approximately 10 thousand households and their members. Though it is intended primarily to assess the expenditure of households, it also contains a wealth of other useful information. For instance, we have detailed information about the demographic and key market labour

characteristics of the entire household, and the incomes of the various individuals, including the income/consumption arising from own production.

The expenditure data are based on a journal kept by the household member most familiar with financial matters for one month, indicating the volume (if applicable) and price of the goods purchased or produced. A year-end survey is also made of the consumption of durable goods, and the final expenditure figure is derived by combining the two figures. Incomes are assessed in a similar manner – monthly, then once a year. The annual assessment of income is not conducted at year end, though, but before the deadline for tax filing, when all sources of income, rather than only one part, are considered. Unless there is a contradiction, the whole-year, rather than the monthly, figure is considered to be definitive. In the case of the HBS, as in all similar surveys, income and expenditure can only be measured with a margin of error. Even so, in both areas the intention is that the survey should be comprehensive.[8]

As only one third of the entire sample is replaced each year within the HBS, each household is covered by the survey for three years (except for drop-outs). In practice, this means that in the periods of 1993–1995, 1996–1998 and 1999–2001 the data of the various households and, unless the composition of the households has changed, of their members can be connected into three separate but identically structured panel databases.[9] Incidences of uninhabited apartments and failed collection attempts mean the sample cannot be representative of the entire population without weighting, and so the CSO weights it across the cross-section. As the panel exhibits diverse reasons for dropping out, we have used the weights documented by Kapitány and Molnár (2001). The partial refusals to answer necessitate a further technical restriction of the sample. These refusals tend not to render the observation completely useless, but they do often relate to important and sensitive information, such as income. Therefore we have left such households out of the analysis.

It is very important that we can observe every person three times. This gives us the chance to grasp, to some extent, the changes in status over time and the trend of their features, and previous or subsequent characteristics can be used in the analyses. Furthermore, we can also address the issue that generally we do not know how long an individual stays in a certain status, and can normally only observe the size of his income. Therefore we have used the panel version of the HBS for the analysis, even though it entails a significant drop in the number of observations.

As the number of observations in the various panels is not too large, we have analysed them together, rather than separately. This may be regarded as an extension of the so-called pooled cross-section analysis method. Accordingly, the first, second and third parts of each panel are treated identically, merged in the corresponding

[8] For the sake of completeness, the CSO staff compile household-level balances, for control purposes, from income and expenditure.

[9] The availability of the data in panel form is attributable to the unstinting work of György Molnár, researcher of the MTA Economics Institute. The weight applicable to the panel is also available as a result of Molnár's efforts, for which I owe him a debt of gratitude.

period of the new, pooled panel. However, as in the case of the pooled cross-section, it is necessary to address the effect of the 'forgotten' historical time. We do this by inflating the cash variables to a common point in time, and, for regression analyses, by including the appropriate control variables and indicators to denote the historical time. One of the former is the macro-regional level participation rate, which we calculate from the CSO Labour Force Survey.

3. Theoretical framework

The personal debate on whether to retire can have two outcomes: to retire or not to retire. The decision is governed partly by the utility offered by the two statuses, and partly by other factors. Such factors may include health, or even the opportunity the individual has to obtain supplementary income as a pensioner, potentially in the grey economy. As we can make only indirect inferences about the latter, we have described the model of the retirement decision without that option. We have also made the assumption that, given certain characteristics, this is a real decision, rather than a compulsion. This requirement, which appears rather far-fetched in theory, becomes less stringent in the empirical study: we only need to assume that characteristics outside the individual's control (such as illness) are independent of the individual characteristics, rather than consequent upon such characteristics, e.g. as a result of a modelled decision.

In accordance with the model of Stock and Wise (1988), retirement can be regarded as an option. Until the application for retirement, the individual has the opportunity to work, and afterwards he receives a pension. The option to switch in the *r*th period has the value $V_t(r)$ in the *t*th period:

$$V_t(r) = \sum_{s=t}^{r-1} \beta^{s-t} U_W(Y_s) + \sum_{t=r}^{S} \beta^{s-t} U_r(P_s(i)),$$

where β is a discount factor describing time preference and is constant for everyone, i is the interest rate, U_w is the utility function applicable during work, U_r is the utility function applicable in pensioner status, Y_s is the income offered by work, P_s is the income offered by pension. In every period, the question for the decision maker is whether it is worth retiring in t, or postponing it to the later time of r. For this, the expected realisable positive gain must be examined for every r, which can be simply formulated as [10]

$$G(r)=\mathrm{E}_t[V_t(r)] - E_t[V_t(t)].$$

According to Stock and Wise (1988), who examined the impact of the structure of US occupational pensions on retirement, both salaries and pensions have a strong, but different, correlation to age. Though in a somewhat different form, this correlation is also applicable in Hungary: salaries increase with age, but at some

[10] The decision rule contains the expected value of utilities instead of the utility of the expected value of incomes. In general, this is not an accurate wording, but the authors find that this compromise is worth making to simplify the discussion.

point this increase comes to a halt, and then goes into reverse. Though the pension is a function of the total life earnings and the time of service, it can be forecast with sufficient certainty from the final salary (see later).

Let us now modify the value function to explicitly express the probability of employment, as well as the pension and unemployment benefit:

$$V_t(r) = \sum_{s=t}^{r-1} \beta^{s-t} U(Y_s \mid N_s = 0)\left[1 - p(z_s \mid N_s = 0)\right] + U(B_s)\, p(z_s \mid N_s = 0) + \sum_{s=r}^{R} \beta^{s-t} U(Y_s \mid N_s = 1)\left[1 - p(z_s \mid N_s = 1)\right] + U(P_s),$$

where R is the time when everyone retires, regardless of calculations (the legal retirement age), N_s is the indicator of pensioner status in s, p is the probability of non-employment as a function of pensioner status and individual characteristics z_s, B_s is the amount of the unemployment benefit, P_s is the amount of the pension. Accordingly, the first line contains the average of the utility of incomes from work or from unemployment benefit, weighted with the probability of non-unemployment and unemployment, aggregated up until retirement. The second line contains the same two income sources for the post-retirement period, but here unemployment benefit is replaced by the pension, and non-unemployment by the probability of employment. Importantly, the latter probabilities are not identical in the two cases. In this case, the utility function difference underlying the decision is:

$$G_t(r) = \sum_{s=t}^{r-1} \beta^{s-t} \left\{ U(Y_s \mid N_s = 1)\left[1 - p(N_s = 1)\right] + U(P_s) - \left[U(Y_s \mid N_s = 0)\left[1 - p(N_s = 0)\right] + U(B_s)\, p(N_s = 0) \right] \right\}$$

Even though this formulation allows people to work as pensioners, we have seen that the probability of this is close to zero. If we take this as an assumption, that is $p(N_s=1)=1$, the above formula becomes simpler:

$$G_t(r) = \sum_{s=t}^{r-1} \beta^{s-t} \left\{ U(P_s) - \left[U(Y_s \mid A_t = 1)\left[1 - p(A_s = 1)\right] + U(B_s)\, p(A_s = 1) \right] \right\}$$

This is the formula that we may use to quantify the motives of behaviour.

However, before discussing that, we must clarify one important issue: does the above decision rule take available incomes sufficiently into account? Could the other income earned in the informal economy, or the compensatory effect of a cohabiting partner, be significant factors? If the answer is yes, the model may perform poorly.

3.1 Digression: the alternatives to inactivity and compensatory effects

If retirement also means inactivity, it will almost certainly result in a certain loss of income. The degree of that loss depends on the amount of the original income and of the pension awarded. If the drop is significant at both the individual and household levels, some adaptation is to be expected. At the individual level, it is possible to exploit some new sources of income (second job, casual work, overtime,

or, in the case of somebody not previously in employment, taking up a job), and at the household level savings can be achieved. Both phenomena may reveal a lot about the impacts of the inactivity of a member of the household, because, in the event of significant loss, the household will (probably) try to find a substitute for the income, or reduce and rearrange expenditure to make sure the most important articles can still be purchased.

3.2 Change in income and expenditure based on raw data

The effect of the change in status can be quantified most easily, in the case of households that are unchanged with respect to their other characteristics, by deducting from one another the values of the examined income and expenditure types measured at two points in time. We can easily do this when using panel data, avoiding confusion of the act of retirement with other effects: the difference thus obtained can be regarded as the effect of becoming inactive, with some limitations. Importantly, due to the nature of the HBS data,[11] we cannot use the data from a given year and the subsequent year for this purpose; instead, an additional year must be inserted in between. Thus, the basis for comparison is the data from t=1 and t=3 (where t is the time). However, this procedure could also play an important role even if it were not demanded by the data: the characteristics of 'pensioner existence' can probably be observed better at a later point in time, once the time necessary for adaptation has elapsed.

We have prepared the calculation in several variants: for men and women, and broken down by the status of the examined person as unemployed or employed in the first period. In order to eliminate uncontrolled impacts, we have made the number of people in the household and the activity of the partner constant. This minimises the potentially disturbing changes, but it precludes the possibility of extensive adaptation, such as taking up employment. As the correlation between the change in activity of partners is approximately 5 per cent, the adaptation thus excluded is not significant. The limitation has the additional disadvantage that the sample size thus obtained is very small – accordingly, the results must be interpreted carefully.

Tables A1, A2, A3 and A4 in Annex A show the outcome of the calculations described.[12] Below we highlight figures from Table A1, describing changes in the

[11] Within a given year, we do not know when an individual's income was received, only the total amount. Consequently, in the year of retirement, a given labour income/pension combination does not reveal whether the person earned a lot for a short period, or little for a long period. Even though, for 1998, we do know how long a certain type of income was received, this would have helped with only one third of our sample.

[12] In order to eliminate the difference in size of households, we have calculated the total income and expenditure per consumption unit, rather than the total income and expenditure in the part of the raw data tables indicating household income. Therefore it is possible that, when the labour income of the examined person and his partner is added, the amount is greater than the total labour income of the household. Tables 'a' always include estimated figures, rather than figures derived from the raw data. As here the method of estimation renders households comparable, I have not narrowed the sample, because this way the number of observations can be several times greater than the raw data.

case of men switching from employment to pensioner status. In the remaining tables we describe the effect of retirement on employed or unemployed women and unemployed men. The effects measured are very similar, though the change in income and consumption are even smaller.

Table 3. The size and actual change of individual and partner income, if an employed male living with a partner becomes inactive as of period t=2 of the panel, and the activity of his partner remains unchanged (N=49)

	Value in t=1	Value in t=3	Change (%)	Ratio in t=1 (%)	Ratio in t=3 (%)
Own income					
Gross salaries	766	0	-100	80	0
Other labour income	89	14	-84	9	3
Pension	93	480	415	10	93
Taxes	262	0	-100	27	0
Total personal income (gross)	963	513	-47	100	100
Total personal income (net)	702	513	-27	73	100
Partner's income					
Gross salaries	468	480	3	75	76
Other labour income	40	29	-28	6	5
Pension	94	107	14	15	17
Taxes	154	152	-1	25	24
Total personal income (gross)	622	629	1	100	100
Total personal income (net)	469	477	2	75	76

Note: Simple averages, with constant economic activity of the partner. Income elements representing a small proportion are not included, thus the total is not necessarily 100%.
Source: own calculations from the relevant periods of the HBS pooled panel (see data description in Section 2).

Table 3 highlights the self-evident fact that the labour income of a person declines upon retirement, and the pension becomes the main element of personal income. It is worth noting that the sizable, 47 per cent drop in gross income is not accompanied by any increase in personal income. On the contrary: other labour income also declines. On the other hand, net incomes decrease considerably less, by 27 per cent. This is because pension, unlike labour income, is not taxable. The situation is even simpler regarding the income of the partner: there is no sign of adaptation (in either direction).

Some income elements are present at the household, rather than the individual, level. Examples include some social aid payments, the gains from the household's agricultural production, and transfers. Table 4 shows the trends of those income sources, as well as of the per capita personal incomes at the level of the household. The latter information is important because, even though it partly coincides in its content with the figures in Table 3, we can argue that it is the size of per capita income, rather than of personal income, that substantially affects individual welfare, and thus the decision to carry on working or to retire.

Table 4. The size and actual change in the household's income, if an employed male living with a partner becomes inactive as of period t=2 of the panel, and the activity of his partner remains unchanged (N=49)

	Value in t=1	Value in t=3	Change (%)	Ratio in t=1 (%)	Ratio in t=3 (%)
Household income					
Gross salary	655	267	-59	65	34
Gain from agricultural production	32	35	9	3	4
Other labour income	66	24	-64	7	3
Own production	93	76	-18	9	10
Pension	99	309	213	10	40
Transfer related to child	25	18	-26	2	2
Transfer to other household	25	28	12	3	4
Taxes	209	79	-62	21	10
Total income (gross)	1008	779	-23	100	100
Total income (net)	773	672	-13	77	86

Notes: Simple averages, with constant economic activity of the partner.
Income elements representing a small proportion are not included, thus the total is not necessarily 100%.
Source: own calculations from the relevant periods of the HBS pooled panel (see data description in Section 2).

The results of the table are in line with what we said above. Apart from a minimal increase in gain from agricultural production, none of the income sources increase. As an important factor, the decline in total net income is only 13 per cent, half the figure calculated for the individual level.

In incomes we see no sign that the reported income of either the retiring person or the partner has changed to compensate for the loss necessarily suffered. It is questionable, however, whether we should accept the income figures as genuine. There is the possibility that, if the compensation is not through legal employment, the income thus earned will not be reflected in the survey. The interviewer may appear to be an official person, from whom such sensitive information is better concealed: incomes are asked about only once, and they must be recorded in the journal only once.

There is no such problem with consumption expenditure. The 'total' is derived from innumerable small expenditure items, which are very difficult, if not impossible, to manipulate. Naturally, we can infer a change in income from a change in the size of expenditure only if savings develop in accordance with some rule of thumb: for instance, as a fixed percentage of income. Table 5 shows the change in the level and structure of consumption expenditure in a structure similar to that above, for the same household group. Assuming that consumers save a constant percentage of their income, the expenditure changes in the same direction as income. If we also assume savings to be zero, there is complete identity. The amount spent on consumer

durables declines on average, which also indicates a decline in the actual disposable income – even though the decline is slight.

Table 5. The size and actual *change in household expenditure, if an* employed *male living with a partner becomes inactive as of period t=2 of the panel, and the activity of his partner remains unchanged (N=49)*

	Value in t=1	Value in t=3	Change (%)	Weight in t=1 (%)	Weight in t=3 (%)
Food	254	220	-13	38	38
Alcoholic beverages and tobacco	55	44	-19	8	7
Self-produced consumption	93	76	-18	14	13
Clothing	53	27	-49	8	5
Housing upkeep	109	113	3	16	19
Transport	70	63	-9	10	11
Other	135	120	-11	20	20
Total expenditure	675	587	-13	100	100
Expanded total expenditure	737	644	-13		
Durables	37	34	-8		

Notes: Simple averages, with constant economic activity of the partner.
Source: own calculations from the relevant periods of the HBS pooled panel (see data description in Section 2).

Not only the size, but also the structure of expenditure may reveal the existence of employment, and thus of unreported income. Expenditure on clothing, transport and meals out generally accompanies employment. In the absence of employment, or as more time is spent in the home, certain other items are consumed in greater quantities: the most important example is expenditure on upkeep of the home (heating, lighting). Almost each related item in Table 5 (except for transport) supports a decline in labour and an increase in time spent at home.

The same phenomenon can be interpreted from another aspect: we can examine the change in the amount spent on clothing and on small-value durable articles using the idea of Browning and Crossley (2004). Accordingly, in the case of a significant drop in income, the most important way of adapting consumption is to cut back on purchases of replacement articles. The change in expenditure ratios indicates that disposable incomes declined, even if only slightly.

There is a more direct relationship between the structure of expenditure and income, namely the Engel curve: the proportion of the various categories of goods in the expenditure structure changes typically with total income (for this and consumption expenditure see the standard work of Deaton and Muellbauer, 1999). Engel first noted the positive correlation between income and food expenditure, which translates to a negative correlation when we look at the share of food expenditure, rather than its level. In Table 5 the proportion of expenditure on food does not change, which goes slightly against our previous conclusions, because it

appears to suggest a near-constant income level. However, if we take into consideration that the correlation is with disposable income, not with total income, it appears to be reasonable, because the reduction in savings and in the consumption of durables may allow disposable income to be maintained at an unchanged level. Unfortunately, we have no direct information about the former, but the latter is underpinned by the evidence of Table 5.

3.3 More accurate measurement of the changes in income and expenditure

The problem with the above approach is that, even though we are going to capture the actual loss suffered, it remains a question how much of that loss is attributable to retirement? It is possible that the change measured would have happened irrespective of the change in the individual's career, due to economic processes: the decision maker in the outlined model also compares his pension with expected future income, rather than with his present salary.

To answer that question, we should consult the literature on economic policies (in Hungarian, Kézdi, 2004 can be recommended as a thorough introduction). In this approach, the retirement is the change ('treatment'), the effects of which we want to measure. Let us now consider the difference in the income of those who retired and those who did not retire between the first and second periods; let us call those differences D_{NY} and D_D, respectively. Assuming that every person (pensioner or not) is the same in his observable and related non-observable characteristics, and the world has changed only in terms of its observable characteristics, D_{NY} would measure the effect perfectly. However, if we allow the world to have changed, then the change in the income of those who did not become inactive (D_D–t) can be regarded as the 'trend' of income change of otherwise identical individuals and must be deducted from the first change.[13] Thus the difference now net of the 'trend' can be regarded as a much better approximation of the effects of inactivity. In practice, the comparison is performed with a regression technique, and we try to achieve the 'everybody is identical' assumption by employing appropriate control variables.

The estimate can be influenced by two factors: measurement errors, and the non-observable factors relating to becoming inactive. As the former are present mostly on the left side of the equation, they can be disregarded.[14] Among non-observed variables, the effect of 'productivity' or 'abilities', notoriously missing from the estimates of salary equations, should be mentioned in particular, as this may introduce heterogeneity into the behaviour of apparently similar persons. Later we shall see that such an effect appears unlikely, and therefore the above method may be legitimate.

[13] In the literature, this procedure is called the 'Difference in differences' method.

[14] I have disregarded the measurement error of the explanatory variables because the panel structure of the database allows for a wide-ranging control of the data. The right side includes only demographic or activity variables, the integrity of which we verified previously.

The 'a' tables of Annex A (A1a, A2a, A3a, A4a) show the results obtained through regression estimates, while the estimated equation is specified at the beginning of the Annex. Instead of a detailed description of the results, a brief summary should suffice: the correction does not lead to results qualitatively different from the previous ones. The loss of income is also slight using the alternative procedure; it is certainly smaller than the raw data would indicate. This means that not only have the retired lost little actual income as compared to their former, employed status, but their loss is smaller than it would have been had they remained in employment. Accordingly, it appears that there is no financial argument against retirement.

3.4 Work in the black economy? – back to the Engel curve

As is evidenced by convincing research results, the size of the black economy in Hungary is not negligible (see Lackó, 2000), and there is a recurring suspicion in connection with those in early retirement that they do black labour under the protective umbrella of the pension, abusing the weaknesses of the regulation. As we compare the proportions of food expenditure in two periods, in effect we invert the Engel curves, and compare the income levels implied by them. To achieve appropriate results, the expenditure ratios of two groups must be compared – this method is formalised in the paper by Lyssiotou *et al.* (2004). In his article, which sets out to measure the size of the black economy in the UK, he attempts to compare the real income of the self-employed and of employees. According to his assumption, there is no concealed income in the case of employees, while in the case of the self-employed it does exist, and every respondent reveals the correct amount spent on foodstuffs. However, estimation of the size of concealed income requires not only the above assumptions, but also that the dispersion of the income of the self-employed is greater than that of employees.

Even though we have everything we need to implement the idea, our experiments on the HBS have been unsuccessful. The income (and total expenditure) of the pensioners surveyed did not disperse any more than the income of non-pensioners. During the estimation of the Engel curves, after the insertion of appropriate control variables, the 'pensioner' indicator did not signal any difference in the amount of food consumption. As we should have seen both phenomena (greater dispersion of incomes, and a significant impact of pensioner status) to identify concealed income, its presence appears to be impossible. Though this result can be interpreted as a failure of the model, it is not necessarily so: the result that no concealed income can be detected is in line with our findings hitherto.

4. Empirical examination of the retirement decision

The empirical framework described in Section 3 leads to a decision-making rule which, if specified appropriately, is suitable for the measurement of effects influencing the retirement decision. The relationship can be described as follows:

$$NY = f(\alpha + \beta w + \gamma we + \delta p + \theta z + v).$$

In the above equation, *NY* is the indicator of retirement (1 or 0), *w* is the wage at the time of the decision, *e* is the probability of employment (non-unemployment), *p* is the amount of pension, *z* is the sum of personal characteristics that determine or directly influence the probability of unemployment, *v* is a random term independent of the previous elements. This simple formulation relies on a number of assumptions, for instance that the expected future wage trend is sufficiently described by the wage in the period concerned, as well as the interaction of the wage and the variable estimating the probability of employment. The latter will be approximated in practice by the wage and some of the *z* characteristics. The estimation can be performed using an appropriate econometric model (logit/probit).[15] Before doing so, however, let us take a look at the above variables, starting with individual characteristics. We expect that every factor that increases the benefits of employment has a negative impact on the probability of retirement, and every factor increasing the benefits of retirement has a positive effect.

Lelkes and Scharle (2004) estimated the probabilities of inactivity for males below retirement age but above 40. According to their results, the probability of inactivity is increased by low educational attainment, closeness to the retirement age, residence in an underdeveloped region and living alone. The problem investigated is somewhat different (inactivity vs. pension), and the two approaches are different in two further important respects. First, here we have used flow rather than stock data. Secondly, we have treated separately the people exiting unemployment and those exiting employment status. To facilitate monitoring of the reasons for the potential difference in the results, we have made the estimates, wherever possible, using both cross-section and flow data.

Thus the surveyed population is the group of people over 40 but at least one year younger than the retirement age effective in 1997 who do not live alone, who, in the first period of the three periods examined, 1) were working, and had no pension-type income, or 2) were unemployed in accordance with the definition of the HBS. In both groups, the 'positive' outcome is if, in the second period, someone had pension income as well, and in the third period had predominantly[16] such income.

The model variants and explanatory variables are summarised below (the models marked 'k' are the variants of the models with the same number estimated using cross-section data):

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[15] It is clear that the greatest simplification occurred before the aforementioned assumption was made, when we modelled the decision in the simplified form disclosed. Though this is a radically reworked form of the 'real' rule, the paper of Lumisdale, Stock and Wise (2000) points out that, if the pension expectation is considered appropriately, the highly complex models that can be estimated only through simulations do not perform any better than a simple bivariate econometric model. In our case, errors could have arisen more when approximating the size of the expectation.

[16] More specifically: over the year had no labour income that amounted to more than 2 months' pension, and that could be regarded as the continuation of his previous employment.

Variable	From unemployment			From employment				
	1.	2.	2.k	1.	2.	2.k	3.	4.
W								
Gross salary	×	×	×	×	×	×	✓	✓
*W*e*								
Salary*qualification	×	×	×	×	×	×	×	✓
P								
Expected pension	×	×	×	×	×	×	×	✓
Z								
School qualification	✓	✓	✓	✓	✓	✓	✓	✓
Age (dummies)	✓	✓	✓	✓	✓	✓	✓	✓
Gender	✓	✓	✓	✓	✓	✓	✓	✓
Aid in own right in t=1	✓	✓	n/a	✓	✓	n/a	✓	✓
Sick pay in t=1	×	×	n/a	✓	✓	n/a	✓	✓
Partner's activity	×	✓	✓	×	✓	✓	✓	✓
Micro-region's part. rate	✓	✓	✓	✓	✓	✓	✓	✓
Type of settlement	✓	✓	✓	✓	✓	✓	✓	✓
Period	✓	✓	✓	✓	✓	✓	✓	✓

Multiplying the salary and the 'qualification' variable (at least secondary qualification) reflects the effect of the uncertainty of employment on the expected income. Of the *z* variable group, age and qualification capture employment potentials and labour market differences not explained by other factors. The 'social aid in own right' and the 'partner's activity' variables capture the funds available in addition to the employment income.[17] The micro-region's activity rate, the type of settlement and the period indicators characterise and keep constant the economic environment of the decision, which is especially needed due to the use of 'stockpiled' panel data. Finally, the sick pay variable is an indicator of health condition, which is unfortunately available only for those who were employed.

For the sake of comparison, we have estimated the narrowest model 1, adapted to the unemployed, using the HBS panel as the cross section. The outcomes described in Annex B are mostly in line with the results of the study by Lelkes and Scharle (2004). As compared to those with fewer than eight years of elementary education, any additional qualification significantly reduces the 'probability' of pensioner status. The increase in age has a similar effect: its progress almost monotonously increases the already positive size of its effect. The existence of welfare aid has a negative effect, which indicates the restraining impact of additional financial resources. In the case of women, there is a greater probability of retirement, which may be explained by the division of labour between men and women, or the different employment structure and differences in the demand shocks on that

[17] The partner's activity can also be interpreted in a more complex framework, as a result of a joint activity strategy. The models of joint household decisions are too complex to be used here, but for methodological reasons it is important to note that if the decisions of two partners are simultaneous, and result in a binary variable, one can be included in the estimated equation without having to worry about its endogeneity (cf. Greene, 2002 on this subject).

structure. Partner activity has a substantial negative effect on the probability of retirement: as we have made the age constant, this is not the effect of cohabiting men and women being of similar age. Finally, we find more pensioners in the capital city than in the other parts of the country.

4.1 Exiting unemployed status – empirical results

Even though the majority of those entering inactivity were previously in employment, there is an important road through unemployment, as a detour to inactivity. Table 6 shows the estimated results of the retirement model on a population set limited to the unemployed.

The only difference between the first and second models is that the latter also includes the partner's activity – however, as this is not only insignificant but also has no effect on the impact of other variables, the two results can be treated as one, and the first column of Table 6 reflects the outcomes of both models. We should reiterate that the base population is that of the unemployed, which may explain this phenomenon through the underlying marked selection process. In line with this, the 2k model is the counterpart of Model 2 estimated on cross-section data; this is why the number of elements is close to three times greater than in the panel data.

Table 6. Probability of exiting from unemployment into pensioner status among males and females over 40 but below retirement age, living with a partner – probit estimate, marginal effect in the average of variables in the sample; (t=s refers to the sth wave of the panel)

	1/2	2k
Specialised qualification	0.175+	0.030
	(0.098)	(0.053)
Secondary qualification	0.189	0.005
	(0.188)	(0.060)
Tertiary qualification	0.189	0.165**
	(0.356)	(0.033)
Age		
49	0.002	0.139**
	(0.137)	(0.032)
50	0.231	0.150**
	(0.149)	(0.025)
51	-0.076	0.159**
	(0.164)	(0.031)
52	0.598**	0.159**
	(0.108)	(0.027)
53	0.414**	0.173**
	(0.103)	(0.019)
54	0.624**	0.198**
	(0.138)	(0.019)
55	0.488*	0.205**
	(0.195)	(0.019)

56	0.435+	0.173**
	(0.241)	(0.029)
57	0.619**	0.192**
	(0.148)	(0.020)
58	0.631**	0.238**
	(0.109)	(0.016)
Female	0.156**	0.139**
	(0.061)	(0.028)
Unemployment benefit in t=1	-0.140**	n/a
	(0.048)	
Aid in own right in t=1	-0.095	n/a
	(0.066)	
Part. rate (micro-region)	-0.996**	-0.158
	(0.368)	(0.178)
1993-4-5 panel	0.328**	0.031
	(0.090)	(0.039)
1996-7-8 panel	0.341**	0.005
	(0.129)	(0.037)
Partner active	-0.005	0.013
	(0.050)	(0.027)
County town	-0.045	0.009
	(0.121)	(0.038)
Other urban	0.078	0.017
	(0.096)	(0.033)
Village	0.003	-0.033
	(0.074)	(0.028)
N	287	923
Average of dependent variable	0.27	0.76
Log-likelihood	-117	-187
Pseudo-R^2	0.30	0.63

Notes: The reference group is that of males living in Budapest, who have not completed elementary education, receive no social aid in their own right or unemployment benefit, included in the 1999–2000 panel, whose partner is inactive.
In parentheses, the asymptotic standard errors robust for the correlation within the micro-regions.
+ significant difference from 0 at 10–5% level; * significant difference from 0 at 5–1% level; ** significant difference from 0 at least at 1% level.

It is worth noting that qualifications, which previously worked as a key variable, have a moderate impact in this case, and, compared to the unqualified, it is only among those with vocational school education that we see a smaller propensity (c. 0.2 per cent) to exit. Women and the elderly are more likely to retire than men. Importantly, two variables available to employment policy – unemployment benefit and the local employment rate – have significant effects: the former reduces the probability of exit into retirement by approximately 15 per cent. The absolute effect

of the local employment rate is close to one unit. The first two panels (1993–1998) show a considerably greater 'autonomous' propensity to go into retirement than the third panel. This is not necessarily because later on fewer unemployed people would have wanted to exit the labour market as old age pensioners: the most important such channel, early retirement, has not been available since 1997. Thus, after 1998, the kind of people who formerly became pensioners from being unemployed probably tried to retire from employment status, or made greater efforts and found jobs again.

In numerical terms, the cross-section results are naturally different from the effect measured using the flow data. In qualitative terms, the results are similar for age and sex, while the effects of qualifications and the economic environment are very different. The latter has no significant impact, while in the cross-sectional equation it is the qualified, rather than the unqualified, who make a difference between the unemployed and the pensioners. The differences seen in the flow and stock data are attributable in this case (as well as later) to those people who had entered pensioner status before the surveyed period. Based on the outcomes, we are inclined to think that there are very few university graduates among those who retired in 1993 or before, but the place of residence of the typical pensioner or unemployed person does not differ based on the rate of employment.

4.2 Exiting employed status – empirical results

There are significant differences between the two routes into pensioned status – from unemployment or employment. Among the aging population, unemployment is rarer than among young people, largely due to the uncertainties involved in job hunting. Those who do become unemployed, and then pensioners, have probably had to resign themselves to this status for some reason. Therefore, those who become pensioners from being in employment have a position in the labour market that is slightly better than average, and this must be considered when interpreting the parameters.

Table 7. Probability of transferring from employment to pensioner status among males and females over 40 but at least 2 years below retirement age – probit estimate, marginal effects in the average of variables in the sample; (t=k refers to the kth wave of the panel)

	1	2	2k	3	4H
Specialised qualification	0.039	0.043	-0.215**	0.042	0.037
	(0.030)	(0.029)	(0.055)	(0.028)	(0.029)
Secondary qualification	0.054	0.067	-0.233**	0.044	0.046
	(0.058)	(0.062)	(0.038)	(0.058)	(0.063)
Tertiary qualification	0.001	0.017	-0.254**	0.008	0.009
	(0.038)	(0.048)	(0.029)	(0.047)	(0.052)
Age					
49	0.022	0.019	0.120**	0.020	0.020
	(0.028)	(0.026)	(0.043)	(0.026)	(0.025)
50	0.012	0.006	0.198**	0.006	0.005
	(0.026)	(0.022)	(0.045)	(0.022)	(0.021)
51	0.080*	0.065*	0.164**	0.063*	0.062+

	(0.036)	(0.032)	(0.053)	(0.032)	(0.034)
52	0.028	0.022	0.292**	0.020	0.019
	(0.035)	(0.031)	(0.051)	(0.030)	(0.028)
53	0.101**	0.080*	0.317**	0.077*	0.072*
	(0.038)	(0.035)	(0.045)	(0.033)	(0.032)
54	0.095	0.080	0.291**	0.084	0.075
	(0.065)	(0.058)	(0.064)	(0.062)	(0.048)
55	0.108	0.087	0.389**	0.081	0.071
	(0.068)	(0.063)	(0.054)	(0.064)	(0.053)
56	0.147*	0.126+	0.429**	0.132+	0.120
	(0.071)	(0.067)	(0.064)	(0.071)	(0.073)
57	0.157+	0.115	0.490**	0.120	0.107
	(0.090)	(0.076)	(0.056)	(0.079)	(0.074)
Female	-0.003	-0.005	0.076**	-0.013	0.023
	(0.008)	(0.008)	(0.022)	(0.008)	(0.022)
Sick pay in t=1	0.055+	0.052+	n/a	0.048+	0.043+
	(0.031)	(0.029)	n/a	(0.028)	(0.025)
Aid in own right in t=1	-0.005	-0.005	-0.133**	-0.005	-0.004
	(0.015)	(0.014)	(0.037)	(0.014)	(0.015)
Partic. rate (micro-region)	-0.027	-0.007	-1.140**	0.001	0.002
	(0.056)	(0.052)	(0.165)	(0.049)	(0.056)
1993-4-5 panel	0.026*	0.025*	0.015	0.025*	0.022+
	(0.013)	(0.012)	(0.023)	(0.012)	(0.012)
1996-7-8 panel	0.016	0.013	0.065*	0.009	0.007
	(0.018)	(0.017)	(0.026)	(0.016)	(0.015)
Partner active		-0.031**	-0.091**	-0.029**	-0.028**
		(0.012)	(0.027)	(0.011)	(0.011)
Salary (HUF thousand)				-0.000*	-0.001*
				(0.000)	(0.000)
Salary*Qualification					0.000
					(0.000)
Pension (HUF thousand)					0.002*
					(0.001)
County town	0.003	0.010	-0.099**	0.002	-0.002
	(0.014)	(0.016)	(0.025)	(0.014)	(0.023)
Other urban	0.004	0.009	-0.109**	0.000	-0.004
	(0.011)	(0.011)	(0.021)	(0.011)	(0.022)
Village	0.017+	0.019+	-0.054*	0.008	0.003
	(0.010)	(0.010)	(0.021)	(0.010)	(0.023)
N	1468	1468	2326	1468	1468
Average of dependent variable	0.047	0.047	0.3	0.047	0.047
Log-likelihood	-250	-245	-1174	-245	-238.4
Pseudo-R^2	0.10	0.12	0.17	0.12	0.14

Notes: The reference group is that of males living in Budapest, who have not completed elementary education, receive no social aid in their own right, included in the 1999–2000 panel, who had not been on sick pay and whose partner is inactive.

In parentheses, the asymptotic standard errors robust for the correlation within the micro-regions.
+ significant difference from 0 at 10–5% level; * significant difference from 0 at 5–1% level; ** significant difference from 0 at least at 1% level.

The first two columns in Table 7 show the measurement results of the two model versions estimated for the unemployed, with the difference that here the status variable for unemployment benefit is not included, while the first-period sick pay variable, which approximates health condition, is. The outcomes are surprising, as they are significantly different from the results gained for the unemployed and for the cross-sectional measurement of the entire population. Qualifications have no effect on retirement, and age starts to have a significant impact only one to two years before retirement age. While there is no apparent difference between the sexes, propensity to retire appears to be greater among village residents and in the early 1990s. This is in line with the economic transition that occurred in the 1990s, which took its toll mostly among agricultural jobs. The existence of the first-period sick pay has a relatively strong and positive impact, which may be an indication of poor health.

The effect of the variable indicating the activity of the partner does not significantly influence outcomes: the significance of the variable does not change – only the size of its effect may alter slightly. The magnitude of the impact is comparable to that of sick pay: one of the most important of the non-external characteristics. Estimating the model containing the partner using the cross-sectional data, we obtain results similar to those of the previous, full cross-sections and those published by Lelkes and Scharle (2004). The only group of indicators that is not significant is that denoting periods. Age, qualifications below eight elementary school years, and Budapest residence have a positive effect on the probability of retirement. The existence of individual aid, partner activity, and a higher participation rate in the micro-region have negative effects. These are all factors that also affect success in the labour market – in the opposite direction. Unlike the previous results, this outcome is closer to what we would intuitively expect.

The difference between the models applied to flow and stock data may potentially be attributable to several reasons. First, the effect may be only apparent, and some variables may not be significant because of the small size of the sample. Even though far fewer people are included in the panel database, the number of observations is unlikely to be an effective limitation, given the number of variables. It is quite likely that the stock of early retirees was 'filled up' before the period under examination, rather than afterwards, by means of the mechanisms captured by the other equations. This difference should be taken into consideration when interpreting the various estimates, and also when hoping to activate the population in early retirement.

Up to now the salaries of the employed played no role in the decision to retire: we have assumed that low and high earners have the same probability of retiring. Salaries may not only indicate factors influencing labour market potentials that cannot be observed; they may also constitute one of the key factors in the retirement

decision in accordance with the model in Section 3. Model 3 of Table 6 shows the outcome of the estimate made using salaries. The results show no major change compared to the previous results: the parameter-estimates of the other variables are practically unchanged, while those of salary are significant statistically, but their practical importance appears to be small. One of the reasons for the almost totally negligible effect could be the fact that in the equation salaries represent not only themselves but also the size of the pension, which is also important in the model.

4.3 Estimation of the pension and potential selection

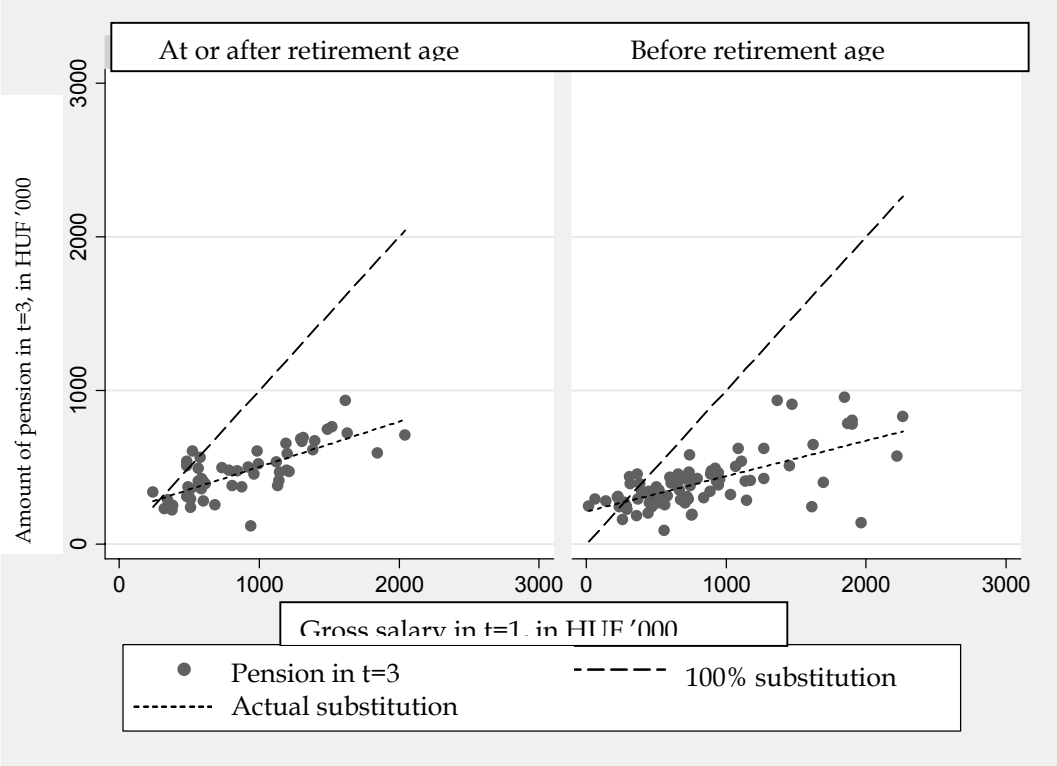
If we know the size of the expected pension and, in the case of continued employment, the expected salary for every pensioner and non-pensioner, we can quantify their individual effect simply, by inserting them into a regression equation. However, as the pension cannot be observed in the case of employees, its expected amount must be computed.

In the Hungarian pension system, the pension is computed based on the gross salary of employees in the years before retirement. If we do not know the work history and the salaries of the final years, the pension cannot be identified accurately. However, a comparison of the gross salaries and pensions measured in the HBS reveals that the gross salary of the last year before retirement explains 60 per cent of the dispersion of the amount of the awarded pension. According to expectation, the explanatory power can be strengthened only by a factor observed at the present time: the interaction of salary and gender variables, which reflects the average shorter working career of women and other effects that influence the wage differences between men and women. There are no other variables in the HBS that would effectively contribute to forecasting the amount of the pension.

Figure 3 shows the correlation between gross salaries and pensions in the case of pensioners retiring before and after the retirement age. To facilitate interpretation, the figure also contains the imaginary line of 100 per cent substitution, where 1 Forint of salary would become 1 Forint of pension. The different positions of the two substitution lines reveal that, due to the constant exchange between the minimum pension and the salary and pension Forints (close-linearity of the substitution line), in the lower range of salaries (especially for early retirement) the substitution is sometimes more than 100 per cent, gradually declining towards higher salaries – and higher pensions. Even though, in the higher salary range, the correlation is looser (probably here the relationship between the final and previous periods becomes looser[18]), it is fairly good for salaries as a whole. The figure does not depict this, but as explained earlier, the exchange rate of salaries and pensions is worse for women than for men – probably because of the years of service missing due to child rearing. Thus, in the case of women, the substitution line is less steep.

[18] More specifically: in the higher earnings ranges only the dispersion of the pensions is higher, while their expected value appears to be a function of salaries in accordance with the previous rule.

Fig. 3. Empirical relationship between gross labour income and pension; full year figures measured in year 2003 HUF



Source: own calculations based on the relevant periods of the HBS pooled panel (see data description in Section 2).

If we project the anticipated pension for those who have not yet retired on the basis of the substitution equation described above, we do not take seriously the prediction of the theoretical model. In line with that, we should find that those who receive more benefit from retirement are more likely to retire. If that is true, however, then the two populations are different in some features, and the expected pension amount of the not-yet-retired cannot be predicted from the substitution line of the already retired.

The '4H' column in Table 8 shows the selection equation of the two-tier Heckman selection model, without the supplementary pension equation (the so-called 'structural probit' from the two, systemic equations). This estimate is essentially analogous to the previous one, where the estimated value of the anticipated pension is also included, and factoring in the possibility that the retired are systematically different from those who continue in employment. The variable performing the selection correction, however, is not significant, and thus we could have estimated the pension even using the simple smallest square method. At the same time, the importance of salaries in the retirement equation has changed: retaining its significance, its effect has become substantial. A 10 thousand HUF salary increase reduces the probability of retirement by one percentage point, while a similar increase in the pension results in a two percentage point increase in probability. It is obvious that the effect of the salaries is weak primarily because it

also incorporates the contrary effect of the pension. In effect, we can state that the direct financial incentives, salaries and pensions have a more than negligible effect on retirement. Still, we found no selection effect, probably due to the characteristics of the pension system.

5. Summary and conclusions

Using the CSO Household Budget Survey (HBS), the study looked at the early retirement of people over 40 but below the retirement age, who live in families. Due to its size and the extent of its inactivity, this age cohort is one of the largest potential labour sources. If there is firm political will to reduce inactivity, it is essential to know which factors in the demand and supply of labour are responsible for the current situation and which can be influenced by market-compatible instruments. International comparison reveals that any (further) raising of the age of retirement could bring about an improvement in employment, provided demand develops adequately. Even though no detailed analysis has been prepared on this issue, the rise in retirement age of recent years has also been followed by increased employment in the affected age groups (primarily among women). Even so, the reduction of the inflow into pensioner status may be more successful in the younger groups, which are potentially easier to employ. Since it is a complex decision process for an individual to exit the labour market and stay outside, in this paper we looked at the labour market behaviour of people who retired before the retirement age, and of their partners.

The switch between labour market statuses is the result of a decision, which is governed by labour-related preferences, as well as by personal and institutional circumstances. In Hungary we find that many of the elderly people who are still below the official retirement age are pensioners, which means, in the overwhelming majority of cases, that they are not in employment. In connection with their behaviour, the fundamental issue is whether, in the current labour market environment and the institutional framework of the pension system, there is any opportunity for them to work instead of staying inactive in the safety of pensioner status. We know that, up until at least 2002, the retirement ages for 1997 remained effective, and so the practical task was actually to look at early retirement as defined at that time. Thus, on the one hand, we have attempted to identify the individual and household characteristics that increase the propensity for inactivity, as well as the correlations thereof, and on the other hand, we have tried to show how the size and composition of income changes as a result of inactivity. The structure of the HBS panel allowed us to review the labour market role and financial strategy of the entire household, tracking changes over time.

This study attempted to quantify the role of the various factors in the retirement decision, based on a simple decision-making model. The model hinges on the assumption that early retirement, mostly disability pensioner status, may be a potential means of escaping the difficulties of the labour market. Therefore we have assumed that the individuals are relatively free to take the decision to use that possibility, aware of the benefits and costs of retirement. The main question is to

what extent the retirement decision is influenced, apart from individual characteristics, by the financial incentives, primarily the amount of the salary and of the pension.

Before we can assess the effects of controllable incomes, we must be able to establish what percentage they represent within people's income. Tracking through time allows us to assess the financial loss entailed in the change of status at the level of the individual and the household. The results indicate that retirement does not bring about any drastic decline in the financial position of people.

Despite the fact that the difference between the average pension of all pensioners and the average net salary of all employees in the same period is quite big, the actual financial loss does not exceed 27 per cent of previous net salary in any of the cases examined. The per capita household income declines by approximately 13 per cent on average if an employee retires, whereas no change was witnessed if an unemployed person becomes a pensioner. The results do not change even if we filter out the effects of the change in the economic environment over time. Naturally, changes reveal nothing about absolute income levels: any loss may be enormous for someone who is poor at the start. It is also an obvious but important conclusion that the actual financial loss to people living on their own may be greater than to those who share a household with others.

It is often assumed that people who retire early exploit their protected status to work in the black, or at least grey, sector of the economy. The available income data are often distorted, and therefore do not necessarily answer that question; but the structure of expenditure can be regarded as a reliable indicator. Despite the varying data quality, the change in both income and expenditure indicates that after retirement no unexpected sources of income appear, and the average person in early retirement does not seek to supplement his income through employment in either the white or the grey economy.

Finally, we looked at the effects of the factors that influence the decision to retire, and this led us to two important conclusions. First, the models calculated from flow data typically yielded different results than other models using stock data estimated from the HBS data or other data sources. As the flow data run from 1994 through the 1990s, we can assume that the difference is attributable to retirements prior to 1994. If our goal is to create instruments that are available to policy makers, it is important to take into consideration these differences, since the population of newly retiring people is different from that of current pensioners: they are better qualified and have a more successful work history. The other important lesson relates to the effect of salaries and expected pensions on retirement. According to our results, both factors have a significant impact, in the expected direction: higher earners are less likely to go into early retirement than those earning less, while people who can expect higher pensions are more likely to decide to retire. However, because of the link between the pension and the final salary, the amount of the pension has a more important effect.

What lessons can social and employment policy learn from all this? From among the two sides shaping inactivity trends, i.e. labour demand and supply, we

have looked at the latter, in particular the effects of financial incentives and the potential for household adaptation. The two factors are in surprising harmony. In the population studied, the loss of job generally does not represent such pressure that returning to the labour market would be an attractive proposition. In many cases, both income and expenditure change so smoothly on the transition into inactivity that this change in itself does not present a serious argument for a return to the labour market, especially in view of the spare time gained. On average, the role of active adaptation is very slight: people survive the decline in their income without changing their behaviour, by reducing their work-related consumption. Thus it appears that, even though it is generally difficult to find a job as a pensioner, there is no real demand anyway, because it is not made essential by financial constraint. At the same time, we have seen that financial incentives – the labour income earned as an employee and the amount of the pension – do have significant effects on the transition to pensioner status.

Consequently, several complex measures are probably required if we are to reduce inactivity. The raising of the (effective) retirement age, as urged by the Lisbon agenda of the EU, is only one, albeit very important, possible step. Even so, tighter control of entry into inactivity appears to be essential. Results indicate that retirement is too easy, especially compared to the strict regulation of transfers to the unemployed. However, we can draw definitive conclusions only if we find out to what extent people retiring 'cheaply' would have been able to keep their previous jobs or to find another job in the labour market. The findings of this study, indicating that higher salaries reduce the probability that people will retire early, may give direction to interventions that serve primarily to reduce wage costs and thus potentially to provide more income to employees. This important issue may be the subject of a subsequent study.

In our view, the results indicate that, to facilitate the clearer separation of employment and social objectives and the related instruments, the social aspect of retirement, and especially of early retirement, must be eliminated; that function should be assumed by other designated institutions. If the institution of early retirement survives, we must consider dramatically increasing the losses entailed by such a decision, because, in the case of a fundamentally growth-oriented and medium income-level economy, this is a luxury article. Even though the data examined indicate this only indirectly, through gauging the probability of transit to pensioner status, a comprehensive review of the system of disability pensions, a reasonable tightening of eligibility criteria, and encouragement to exit that status are of utmost importance, together with rehabilitation of patients who can be cured.

The disappearance of the forms of early retirement and the potential raising of the retirement age would dramatically worsen unemployment indicators, but activity ratios would improve. Even more importantly, however, we would call a spade a spade, and would identify the increasingly important challenge: to resolve the issue of employing the elderly.

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Annex A – Changes in the income of households and partners, and expenditure of households, when one member becomes inactive

The equation estimated for the four [gender] x [original activity category] groups was the following (using the description of linear models):

ΔVÁLTOZÓ13 ~ INAKT23 + PMN1_IN3 + PMN1_DOL3 + PIN1_MN3 + PIN1_DOL3 + PDOL1_MN3 + ΔDOLOZOK13 + ALAPFOK + KOZEPFOK + FELSOFOK + PALAPFOK + PKOZEPFOK + PFELSOFOK + KOR + PKOR + PANEL1 + PANEL2,

where the variables are interpreted as follows:

ΔVÁLTOZÓ13: the difference in the values of the relevant variable measured in the 3rd and 1st periods

INAKT23: indicator variable denoting those inactive in the 2nd and 3rd periods

PMN1_IN3, PMN1_DOL3, PIN1_MN3, PIN1_DOL3, PDOL1_MN3: indicator showing the transition between the labour market statuses of the partner in the 1st and 3rd periods – MunkaNélküli (Unemployed), Inaktív (inactive), DOLgozik (Employed)

ΔDOLOZOK13: difference in the number of working members of the household in the 1st and 3rd periods

(P)ALAPFOK, (P)KOZEPFOK, (P)FELSOFOK: indicators of the school achievement (of partner) (elementary, secondary, tertiary)

(P)KOR: the age (of partner) in years

PANEL1, PANEL2: indicator of the relevant panel

It should be noted that the above equation is applicable to every variable examined, but it is not 'tailored' to any one of them. The thorough modelling of the expenditure alone would deserve a separate paper, and no state-of-the-art empirical expenditure model has been devised in Hungary as yet. Despite these considerations, we decided to use an identical, simple function format to estimate every income and expenditure category. In addition to easy manageability and transparency, this had the result that the characteristics and constraints required by consumption theory are not reflected in the model. For instance, if we add the estimated changes to the previous value, we get negative expenditure for the product category concerned, and total expenditure in excess of the entire expenditure for the entirety of products. Taking this into consideration, the structure of the 'plain' and 'a' tables are different: for instance, in the latter we do not disclose the hypothetical structure of income and expenditure in the third period.

Table A1. Size and actual change in household income and expenditure, and in own and partner's income, if a working male living with a partner becomes inactive as of the 2nd period of the panel, and the partner's activity does not change (N=49)

	Value in t=1	Value in t=3	Change (%)	Weight in t=1 (%)	Weight in t=3 (%)
Household income					
Gross salary	655	267	-59	65	34
Severance pay	0	1		0	0
Agric. profit	32	35	9	3	4
Other labour income	66	24	-64	7	3
From savings	10	2	-79	1	0
From own production	93	76	-18	9	10
Other income	8	7	-11	1	1
Pension	99	309	213	10	40
Unemployment transfer	7	8	13	1	1
Child-related transfer	25	18	-26	2	2
Other public transfer	6	12	80	1	1
Transfer from other household	6	20	224	1	3
Transfer to other household	25	28	12	3	4
Taxes and contributions	209	79	-62	21	10
Total income (gross)	1008	779	-23	100	100
Total income (net)	773	672	-13	77	86
Household expenditure					
Food	254	220	-13	38	38
Alcohol and tobacco	55	44	-19	8	7
Self-produced consumption	93	76	-18	14	13
Clothing	53	27	-49	8	5
Home upkeep expenses	109	113	3	16	19
Transport	70	63	-9	10	11
Other	135	120	-11	20	20
Total expenditure	675	587	-13	100	100
Extended total expenditure	737	644	-13		
Durable articles	37	34	-8		
Own income					
Gross salary	766	0	-100	80	0
Other income from full-time job	1	0	-100	0	0
Severance pay	0	0		0	0
Other labour income	89	14	-84	9	3
Other income	6	0	-100	1	0
Pension	93	480	415	10	93
Unemployment income	4	7	60	0	1
Child-related transfers	0	0		0	0

Other personal public transfers	4	13	234	0	3
Taxes and contributions	262	0	-100	27	0
Total personal income (gross)	963	513	-47	100	100
Total personal income (net)	702	513	-27	73	100
Partner's income					
Gross salary	468	480	3	75	76
Other income from full-time job	0	0		0	0
Severance pay	0	0		0	0
Other labour income	40	29	-28	6	5
Other income	5	2	-59	1	0
Pension	94	107	14	15	17
Unemployment income	14	4	-71	2	1
Child-related transfers	0	0		0	0
Other personal public transfers	0	6		0	1
Taxes and contributions	154	152	-1	25	24
Total personal income (gross)	622	629	1	100	100
Total personal income (net)	469	477	2	75	76

Notes: Simple averages with constant economic activity of partner.
Source: own calculations based on the relevant periods of the HBS pooled panel (see data description in Section 2).

Table A1a: Size of household income and expenditure, and of own and partner's income, as well as the changes therein estimated by excluding other effects, if a working male living with a partner becomes inactive as of the 2nd period of the panel (N=1041)

	Value in t=1	Ratio (%)	Change	Std. Error	S.	Change (%)
Household income						
Gross salary	1614	68	-371	102	*	-23
Severance pay	6	0	0	12		4
Agric. profit	33	1	12	36		35
Other labour income	198	8	-23	56		-12
From savings	8	0	-29	12	*	-369
From own production	198	8	-26	27		-13
Other income	20	1	-5	13		-28
Pension	101	4	284	27	*	281
Unemployment transfer	31	1	-16	14		-52
Child-related transfer	124	5	5	21		4
Other public transfer	15	1	10	10		67
Transfer from other household	26	1	22	9	*	87
Transfer to other household	53	2	-3	17		-6
Taxes and contributions	532	22	-149	43	*	-28
Total income (gross)	2374	100	-138	111		-6
Total income (net)	1789	75	14	87		1
Household expenditure						

Food	587	37	-56	39		-10
Alcohol and tobacco	102	6	-17	14		-17
Self-produced consumption	198	12	-26	27		-13
Clothing	140	9	-5	19		-3
Home upkeep expenses	248	16	-18	16		-7
Transport	184	12	4	24		2
Other	326	21	-48	39		-15
Total expenditure	1587	100	-140	86		-9
Extended total expenditure	1776	112	-75	115		-4
Durable articles	99	6	18	52		19
Own income						
Gross salary	926	85	-466	73	*	-50
Other income from full-time job	0	0	-1	1		-292
Severance pay	3	0	0	11		-6
Other labour income	146	13	-26	48		-18
Other income	4	0	-7	8		-183
Pension	9	1	304	19	*	3329
Unemployment income	4	0	-21	8	*	-583
Child-related transfers	0	0	0	0		
Other personal public transfers	1	0	6	3	*	712
Taxes and contributions	331	30	-160	33	*	-49
Total personal income (gross)	1093	100	-210	67	*	-19
Total personal income (net)	762	70	-50	43		-7
Partner's income						
Gross salary	523	81	60	41		12
Other income from full-time job	0	0	0	0		0
Severance pay	2	0	-1	5		-57
Other labour income	37	6	0	19		1
Other income	3	0	-5	4		-188
Pension	53	8	-15	13		-28
Unemployment income	20	3	0	7		0
Child-related transfers	6	1	1	5		
Other personal public transfers	4	1	1	7		38
Taxes and contributions	157	24	6	18		4
Total personal income (gross)	647	100	42	40		6
Total personal income (net)	490	76	36	27		7

Notes: The values calculated in t=1 are simple averages for men between 40 and the retirement age, working at the time and living with a partner, and for the households they live in. Changes are the regression estimate of the indicator variable of 'inactive as a result of loss of job in t=2 and t=3', where on the right there is the change in the income or expenditure category concerned between the 1st and 3rd periods, while on the left, there is

the activity of the partner, the number of people in the household, the number of working people, the qualifications of the person concerned and his partner, or the range thereof, as well as the indicators of historic time.
'Std. error' indicates the standard error of the estimate of the change, while the 'S' column shows the significance level at which the deviance can be regarded as different from zero. The asterisk (*) indicates a deviance that is significant at 5%, and the + sign, at 10%.
Source: own calculations based on the relevant periods of the HBS pooled panel (see data description in Section 2).

Table A2. Size and actual change in household income and expenditure, and in own and partner's income, if an unemployed male living with a partner becomes inactive as of the 2nd period of the panel, and the partner's activity does not change (N=49)

	Value in t=1	Value in t=3	Change (%)	Weight in t=1 (%)	Weight in t=3 (%)
Household income					
Gross salary	193	194	1	31	33
Severance pay	21	2	-92	3	0
Agric. profit	26	5	-82	4	1
Other labour income	30	16	-48	5	3
From savings	0	2	314	0	0
From own production	79	71	-11	13	12
Other income	6	8	30	1	1
Pension	107	236	120	17	40
Unemployment transfer	113	13	-88	18	2
Child-related transfer	31	32	3	5	5
Other public transfer	17	9	-48	3	2
Transfer from other household	6	9	59	1	2
Transfer to other household	30	25	-17	5	4
Taxes and contributions	62	53	-14	10	9
Total income (gross)	630	597	-5	100	100
Total income (net)	539	519	-4	85	87
Household expenditure					
Food	233	206	-12	46	43
Alcohol and tobacco	47	42	-12	9	9
Self-produced consumption	79	71	-11	16	15
Clothing	31	29	-7	6	6
Home upkeep expenses	82	97	17	16	20
Transport	51	40	-20	10	8
Other	63	70	11	12	14
Total expenditure	507	483	-5	100	100
Extended total expenditure	561	524	-7		
Durable articles	17	13	-24		
Own income					

Gross salary	23	5	-77	7	2
Other income from full-time job	0	0		0	0
Severance pay	31	0	-100	9	0
Other labour income	5	0	-100	2	0
Other income	0	0		0	0
Pension	61	299	390	18	97
Unemployment income	208	0	-100	61	0
Child-related transfers	0	0		0	0
Other personal public transfers	16	5	-71	5	2
Taxes and contributions	22	1	-97	6	0
Total personal income (gross)	344	309	-10	100	100
Total personal income (net)	322	308	-4	94	100
Partner's income					
Gross salary	281	316	13	61	65
Other income from full-time job	0	0		0	0
Severance pay	0	5		0	1
Other labour income	13	9	-32	3	2
Other income	6	4	-34	1	1
Pension	133	134	1	29	28
Unemployment income	15	5	-67	3	1
Child-related transfers	0	7		0	2
Other personal public transfers	9	6	-33	2	1
Taxes and contributions	66	83	26	14	17
Total personal income (gross)	457	486	6	100	100
Total personal income (net)	391	403	3	86	83

Notes: Simple averages with constant economic activity of partner.
Source: own calculations based on the relevant periods of the HBS pooled panel (see data description in Section 2).

Table A2a: Size of household income and expenditure, and of own and partner's income, as well as the changes therein estimated by excluding other effects, if an unemployed male living with a partner becomes inactive as of the 2nd period of the panel (N=196)

	Value in t=1	Ratio (%)	Change	Std. error	S.	Change (%)
Household income						
Gross salary	561	38	-38	89		-7
Severance pay	20	1	3	20		15
Agric. Profit	40	3	-15	51		-38
Other labour income	73	5	-75	72		-103
From savings	2	0	-2	3		-153
From own production	184	13	-1	27		-1
Other income	20	1	-29	22		-149
Pension	128	9	172	43	*	135
Unemployment transfer	244	17	-28	43		-12

Child-related transfer	135	9	48	24	*	35
Other public transfer	21	1	-10	20		-47
Transfer from other household	30	2	1	16		4
Transfer to other household	36	2	-38	19	*	-106
Taxes and contributions	162	11	-14	34		-9
Total income (gross)	1458	100	26	109		2
Total income (net)	1260	86	78	97		6
Household expenditures						
Food	503	43	-12	38		-2
Alcohol and tobacco	98	8	8	13		8
Self-produced consumption	184	16	-1	27		-1
Clothing	85	7	10	20		12
Home upkeep expenses	209	18	53	19	*	25
Transport	97	8	2	22		2
Other	183	16	50	44		28
Total expenditure	1175	100	111	86		9
Extended total expenditure	1319	112	101	131		8
Durable articles	64	5	25	51		40
Own income						
Gross salary	83	23	-106	62	+	-128
Other income from full-time job	0	0	0	0		
Severance pay	16	5	5	19		30
Other labour income	33	9	-58	65		-178
Other income	3	1	6	7		165
Pension	15	4	143	24	*	948
Unemployment income	200	56	-64	35	+	-32
Child-related transfers	0	0	0	0		
Other personal public transfers	6	2	-7	12		-114
Taxes and contributions	39	11	-23	21		-61
Total personal income (gross)	356	100	-82	75		-23
Total personal income (net)	317	89	-58	63		-18
Partner's income						
Gross salary	350	69	69	44		20
Other income from full-time job	0	0	-1	1		-274
Severance pay	2	0	-2	6		-129
Other labour income	24	5	-22	14		-93
Other income	9	2	-44	19	*	-478
Pension	74	15	-5	22		-6

Unemployment income	36	7	18	15	50
Child-related transfers	8	2	0	8	
Other personal public transfers	5	1	-6	9	-109
Taxes and contributions	92	18	8	20	9
Total personal income (gross)	508	100	8	46	1
Total personal income (net)	415	82	-1	35	0

Notes: The values calculated in t=1 are simple averages for men between 40 and the retirement age, unemployed at the time and living with a partner, and for the households they live in. Changes are the regression estimate of the indicator variable of 'inactive as a result of loss of job in t=2 and t=3', where on the right there is the change in the income or expenditure category concerned between the 1st and 3rd periods, while on the left, there is the activity of the partner, the number of people in the household, the number of working people, the qualification of the person concerned and his partner, or the range thereof, as well as the indicators of historic time.
'Std. error' indicates the standard error of the estimate of the change, while the 'S' column shows the significance level at which the deviance can be regarded as different from zero. The asterisk (*) indicates a deviance that is significant at 5%, and the + sign, at 10%.
Source: own calculations based on the relevant periods of the HBS pooled panel (see data description in Section 2).

Table A3: Size and actual change in household income and expenditure, and of own and partner's income, if a working female living with a partner becomes inactive as of the 2nd period of the panel, and the partner's activity does not change (N=32)

	Value in t=1	Value in t=3	Change (%)	Weight in t=1 (%)	Weight in t=3 (%)
Household income					
Gross salary	542	301	-44	63	40
Severance pay	0	4		0	1
Agric. profit	-16	-10	-42	-2	-1
Other labour income	51	61	19	6	8
From savings	4	4	-5	1	1
From own production	76	82	8	9	11
Other income	6	11	97	1	1
Pension	154	284	85	18	37
Unemployment transfer	19	4	-78	2	1
Child-related transfer	18	9	-50	2	1
Other public transfer	2	3	20	0	0
Transfer from other household	11	6	-45	1	1
Transfer to other household	25	32	27	3	4
Taxes and contributions	164	111	-32	19	15
Total income (gross)	867	759	-12	100	100
Total income (net)	678	616	-9	78	81

	Value in t=1	Value in t=3	Change (%)	Weight in t=1 (%)	Weight in t=3 (%)
Own income					
Gross salary	421	50	-88	75	14
Other income from full-time job	0	0		0	0
Severance pay	0	0		0	0
Other labour income	55	5	-91	10	1
Other income	0	0		0	0
Pension	64	296	361	11	83
Unemployment income	20	0	-100	4	0
Child-related transfers	0	3		0	1
Other personal public transfers	0	1		0	0
Taxes and contributions	117	14	-88	21	4
Total personal income (gross)	560	355	-37	100	100
Total personal income (net)	442	340	-23	79	96
Partner's income					
Gross salary	533	431	-19	66	54
Other income from full-time job	0	0		0	0
Severance pay	0	7		0	1
Other labour income	62	118	90	8	15
Other income	0	1		0	0
Pension	214	232	8	26	29
Unemployment income	0	5		0	1
Child-related transfers	0	0		0	0
Other personal public transfers	0	0	24	0	0
Taxes and contributions	181	174	-4	22	22
Total personal income (gross)	809	795	-2	100	100
Total personal income (net)	628	620	-1	78	78

Notes: Simple averages with constant economic activity of partner.
Source: own calculations based on the relevant periods of the HBS pooled panel (see data description in Section 2).

Table A3a: Size of household income and expenditure, and of own and partner's income, as well as the changes therein estimated by excluding other effects, if a working female living with a partner becomes inactive as of the 2nd period of the panel (N=720)

	Value in t=1	Ratio (%)	Change	Std. error	S.	Change (%)
Household income						
Gross salary	1688	69	-226	127	+	-13
Severance pay	7	0	11	15		163
Agric. profit	34	1	33	47		99
Other labour income	159	7	85	66		53
From savings	15	1	32	31		212
From own production	186	8	45	31		24
Other income	25	1	-20	17		-81
Pension	168	7	154	35	*	92
Unemployment transfer	33	1	-36	17	*	-110
Child-related transfer	83	3	-23	28		-28
Other public transfer	15	1	0	10		2
Transfer from other household	22	1	-5	9		-22
Transfer to other household	64	3	16	25		26
Taxes and contributions	544	22	-45	55		-8
Total income (gross)	2434	100	48	141		2
Total income (net)	1826	75	77	114		4
Household expenditure						
Food	578	36	29	49		5
Alcohol and tobacco	103	6	-9	19		-9
Self-produced consumption	186	12	45	31		24
Clothing	131	8	-10	22		-8
Home upkeep expenses	252	16	12	21		5
Transport	196	12	-12	31		-6
Other	333	21	39	46		12
Total expenditure	1593	100	48	107		3
Extended total expenditure	1797	113	-12	154		-1
Durable articles	118	7	-77	82		-66
Own income						
Gross salary	776	92	-265	65	*	-34
Other income from full-time job	0	0	0	1		130
Severance pay	3	0	-1	10		-29
Other labour income	50	6	-7	30		-15
Other income	6	1	-31	10	*	-477
Pension	6	1	181	17	*	3072
Unemployment income	4	0	-27	7	*	-737
Child-related transfers	0	0	5	2	*	
Other personal public transfers	1	0	1	3		55
Taxes and contributions	233	27	-87	27	*	-37

Total personal income (gross)	847	100	-145	58	*	-17
Total personal income (net)	614	73	-58	37		-9
Partner's income						
Gross salary	707	75	16	85		2
Other income from full-time job	0	0	0	1		0
Severance pay	4	0	11	11		302
Other labour income	89	9	41	53		46
Other income	3	0	0	6		-4
Pension	120	13	-32	25		-27
Unemployment income	20	2	11	10		59
Child-related transfers	0	0	0	0		
Other personal public transfers	2	0	-2	5		-124
Taxes and contributions	257	27	22	39		9
Total personal income (gross)	945	100	46	77		5
Total personal income (net)	688	73	24	49		3

Notes: The values calculated in t=1 are simple averages for women between 40 and the retirement age, working at the time and living with a partner, and for the households they live in. Changes are the regression estimate of the indicator variable of 'inactive as a result of loss of job in t=2 and t=3', where on the right there is the change in the income or expenditure category concerned between the 1st and 3rd periods, while on the left, there is the activity of the partner, the number of people in the household, the number of working people, the qualification of the person concerned and her partner, or the range thereof, as well as the indicators of historic time.
'Std. error' indicates the standard error of the estimate of the change, while the 'S' column shows the significance level at which the deviance can be regarded as different from zero. The asterisk (*) indicates a deviance that is significant at 5%, and the + sign, at 10%.
Source: own calculations based on the relevant periods of the HBS pooled panel (see data description in Section 2).

Table A4. Size and actual change in household income and expenditure, and of own and partner's income, if an unemployed female living with a partner becomes inactive as of the 2nd period of the panel (N=27)

	Value in t=1	Value in t=3	Change (%)	Weight in t=1 (%)	Weight in t=3 (%)
Household income					
Gross salary	345	268	-22	43	37
Severance pay	6	0	-100	1	0
Agric. profit	10	18	85	1	3
Other labour income	68	67	-2	8	9
From savings	1	1	-24	0	0
From own production	89	91	3	11	12
Other income	8	5	-40	1	1
Pension	126	224	78	16	31

Unemployment transfer	117	24	-80	15	3
Child-related transfer	19	16	-17	2	2
Other public transfer	5	5	-4	1	1
Transfer from other household	12	14	17	1	2
Transfer to other household	29	23	-23	4	3
Taxes and contributions	128	99	-23	16	14
Total income (gross)	806	731	-9	100	100
Total income (net)	648	609	-6	80	83
Household expenditure					
Food	250	241	-4	42	44
Alcohol and tobacco	47	40	-15	8	7
Self-produced consumption	89	91	3	15	17
Clothing	47	19	-60	8	3
Home upkeep expenses	95	114	20	16	21
Transport	55	34	-38	9	6
Other	107	102	-5	18	19
Total expenditure	603	551	-9	100	100
Extended total expenditure	642	578	-10		
Durable articles	18	11	-35		
Own income					
Gross salary	34	6	-81	12	3
Other income from full-time job	0	0		0	0
Severance pay	5	0	-100	2	0
Other labour income	1	1	-6	0	1
Other income	0	1		0	0
Pension	29	208	613	11	94
Unemployment income	204	0	-100	74	0
Child-related transfers	3	0	-100	1	0
Other personal public transfers	0	5		0	2
Taxes and contributions	18	1	-96	7	0
Total personal income (gross)	275	221	-20	100	100
Total personal income (net)	257	221	-14	93	100
Partner's income					
Gross salary	414	384	-7	52	51
Other income from full-time job	0	0		0	0
Severance pay	0	0		0	0
Other labour income	134	142	6	17	19
Other income	9	4	-59	1	1
Pension	223	197	-11	28	26
Unemployment income	14	32	134	2	4

Child-related transfers	0	0		0	0
Other personal public transfers	1	0	-100	0	0
Taxes and contributions	171	158	-8	22	21
Total personal income (gross)	794	759	-4	100	100
Total personal income (net)	623	601	-3	78	79

Notes: Simple averages with constant economic activity of partner.
Source: own calculations based on the relevant periods of the HBS pooled panel (see data description in Section 2).

Table A4a. Size of household income and expenditure, and of own and partner's income, as well as the changes therein estimated by excluding other effects, if an unemployed female living with a partner becomes inactive as of the 2nd period of the panel (N=96)

	Value in t=1	Ratio (%)	Change	Std. error	S.	Change (%)
Household income						
Gross salary	660	41	-146	167		-22
Severance pay	6	0	-15	8	*	-263
Agric. profit	25	2	-15	77		-61
Other labour income	169	10	-12	124		-7
From savings	3	0	8	6		293
From own production	185	11	30	41		16
Other income	31	2	-10	41		-31
Pension	139	9	65	53		47
Unemployment transfer	272	17	-52	51		-19
Child-related transfer	86	5	25	23		29
Other public transfer	25	2	20	24		81
Transfer from other household	22	1	7	11		33
Transfer to other household	43	3	-40	18	*	-93
Taxes and contributions	240	15	-18	59		-7
Total income (gross)	1621	100	-95	199		-6
Total income (net)	1338	83	-37	160		-3
Household expenditure						
Food	521	41	29	46		5
Alcohol and tobacco	102	8	19	18		19
Self-produced consumption	185	15	30	41		16
Clothing	98	8	-39	23	+	-40
Home upkeep expenses	214	17	38	29		18
Transport	121	10	-1	31		-1
Other	202	16	-26	41		-13
Total expenditure	1259	100	19	85		2
Extended total expenditure	1341	107	0	103		0
Durable articles	29	2	-23	23		-78
Own income						

Gross salary	53	17	-81	67		-153
Other income from full-time job	0	0	0	0		
Severance pay	3	1	-5	5		-158
Other labour income	16	5	-9	13		-60
Other income	24	7	5	36		22
Pension	8	3	75	25	*	916
Unemployment income	204	64	-57	37		-28
Child-related transfers	1	0	-4	2	*	
Other personal public transfers	9	3	12	13		134
Taxes and contributions	25	8	-29	22		-114
Total personal income (gross)	318	100	-64	81		-20
Total personal income (net)	292	92	-35	65		-12
Partner's income						
Gross salary	426	59	85	95		20
Other income from full-time job	0	0	0	0		
Severance pay	0	0	0	0		
Other labour income	129	18	-14	115		-11
Other income	3	0	-9	8		-337
Pension	101	14	-45	39		-44
Unemployment income	56	8	24	27		43
Child-related transfers	0	0	0	0		
Other personal public transfers	5	1	0	13		-9
Taxes and contributions	162	23	35	37		21
Total personal income (gross)	718	100	41	117		6
Total personal income (net)	557	77	7	100		1

Notes: The values calculated in t=1 are simple averages for women between 40 and the retirement age, unemployed at the time and living with a partner, and for the households they live in. Changes are the regression estimate of the indicator variable of 'inactive as a result of loss of job in t=2 and t=3', where on the right there is the change in the income or expenditure category concerned between the 1st and 3rd periods, while on the left, there is the activity of the partner, the number of people in the household, the number of working people, the qualification of the person concerned and her partner, or the range thereof, as well as the indicators of historic time.

'Std. error' indicates the standard error of the estimate of the change, while the 'S' column shows the significance level at which the deviance can be regarded as different from zero. The asterisk (*) indicates a deviance that is significant at 5%, and the + sign, at 10%.

Source: own calculations based on the relevant periods of the HBS pooled panel (see data description in Section 2).

Annex B: Estimation of the probability of pensioner status from cross-sectional data

'Probability' of pensioner status among men and women above 40 but at least 2 years before retirement age, living with a partner – probit estimate, marginal effect in the average of variables in the sample; estimate from the middle waves of the pooled HBS panel

Specialised qualification		-0.107**
		(0.039)
Secondary qualification		-0.134**
		(0.030)
Tertiary qualification		-0.173**
		(0.026)
Age		
	49	0.121**
		(0.040)
	50	0.195**
		(0.040)
	51	0.160**
		(0.047)
	52	0.287**
		(0.046)
	53	0.313**
		(0.042)
	54	0.263**
		(0.060)
	55	0.347**
		(0.053)
	56	0.397**
		(0.072)
	57	0.449**
		(0.058)
	58	0.558**
		(0.048)
Female		0.042*
		(0.018)
Aid in own right		-0.121**
		(0.029)
Partic. rate (micro-region)		-0.905**
		(0.130)
1994		0.016
		(0.020)
1997		0.067**
		(0.023)
Partner active		-0.077**

	(0.022)
County town	-0.080**
	(0.019)
Other urban	-0.091**
	(0.016)
Village	-0.051**
	(0.017)
N	2729
Average of dependent variable	0.26
Log-likelihood	-1272
Pseudo-R^2	0.18

Notes: The reference group is that of males living in Budapest, who have not completed elementary education, receive no aid in their own right, included in the 1999–2000 panel, whose partner is inactive.

In parentheses, the asymptotic standard errors robust for the correlation within the micro-regions.

+ significant difference from 0 at 10–5% level; * significant difference from 0 at 5–1% level; ** significant difference from 0 at least at 1% level.

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